How do contractors evaluate company competitiveness and market attractiveness? The case of Toronto contractors

T.E. El-Diraby, J. Costa, and S. Singh

Abstract: The Canadian construction industry has sustained a healthy growth rate over the last 10 years. This could make the Canadian market attractive to foreign competitors. Moreover, Canadian companies possess enough expertise and resources to be able to effectively compete in the global market. This highlights the increased importance of developing marketing strategies for Canadian companies. This research study provides an understanding of how Toronto construction companies evaluate market attractiveness and company competitiveness. Such evaluation is the first step towards building effective marketing strategies. The research included an analysis of the main indicators of the Toronto market over the last 10 years and one-on-one interviews with 39 experts. The research deployed the analytical hierarchy process to identify the most important factors that can be used for measuring company competitiveness and market attractiveness. The most important factors that influence company competitiveness include customer satisfaction, cost efficiency, and safety record. Factors with the highest impact on market attractiveness are sustainable profitability (return on investment), supply of finance, and overall economic conditions.

Key words: construction marketing, company competitiveness, market attractiveness, strategic planning, analytical hierarchy process.

Résumé : Au cours des 10 dernières années, l'industrie canadienne de la construction a connu un bon taux de croissance, ce qui pourrait rendre le marché canadien encore plus attrayant pour les investisseurs étrangers. Cependant, les compagnies canadiennes possèdent suffisamment d'expertise et de ressources pour compétitionner efficacement sur les marchés mondiaux. Cela souligne l'importance accrue du développement de stratégies de marketing pour les compagnies canadiennes. Cette étude permet de mieux comprendre la manière dont les compagnies de construction de Toronto évaluent l'attractivité du marché et la compétitivité des compagnies. Une telle évaluation est la première étape vers des stratégies de marketing efficaces en construction. La recherche comprend une analyse des principaux indicateurs du marché de Toronto au cours des 10 dernières années et des entrevues individuelles avec 39 experts. La recherche a utilisé le processus de hiérarchie analytique afin d'identifier les facteurs les plus importants pour mesurer la compétitivité des compagnies et l'attractivité des marchés. Les facteurs les plus importants influençant la compétitivité des compagnies comprennent la satisfaction des clients, la rentabilité et le dossier de sécurité. Les facteurs ayant le plus fort impact sur l'attractivité des marchés sont la profitabilité durable (RCI) et les conditions de financement et de l'économie en général.

Mots clés : marketing de construction, compétitivité des compagnies, attractivité des marchés, planification stratégique, processus de hiérarchie analytique.

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Introduction

Canadian construction contractors have recently experienced significant market growth. Industrial construction activity showed the strongest increase in 1998, with a 200% growth in construction starts from 1997 levels, while residential housing starts increased 25%, commercial construction by more than 30%, and institutional building starts by 15% (US Department of Commerce 2000). In 2000, the total investment in infrastructure in Canada surpassed CAN$40 billion (Industry Canada 2000). As of 2002, Statistics Canada estimates that the annual investments and expenditures

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on infrastructure were CAN$17.7 billion (Harchaoui et al. 2003).

To enhance their profitability and sustain their market share, it is important for contractors to understand the drivers that have a bearing on their competitiveness in local markets. It is also important to be able to evaluate the suitability (relative attractiveness) of new and existing markets. Company competitiveness refers to its ability to design, produce, and (or) market products superior to those offered by competitors, considering the price and nonprice qualities. Market attractiveness is a characteristic of the market that makes it attractive to organizations to invest in such a market.

This paper presents the results of a research project aimed at finding how Toronto area contractors evaluate company competitiveness and market attractiveness in local markets. Such an understanding is the first step for building effective marketing strategies, including (*i*) identifying proper product mixes (which products to offer in which markets), (*ii*) developing resource acquisition plans and markets, and (*iii*) setting market penetration schemas.

The research scope focused on the Toronto area, however, some of the findings could be relevant to contractors in other areas in Canada. While the main focus of the paper is geared towards a local Canadian market, the establishment (and understanding) of relevant criteria for competitiveness and market attractiveness is a key in helping organizations explore and succeed in foreign markets (Kotler and Armstrong 1991; Arditi and Davis 1988). It also provides a basis for establishing effective deregulation schemes that protect local Canadian industry and negotiating better trade agreements that support Canadian companies globally.

Background

Competitiveness can be defined as supporting the ability of companies, industries, regions, nations, or supernational regions to generate, while being (and remaining) exposed to international competition, relatively high factor income and factor employment levels. It can also be defined at three hierarchical levels (Momaya 1996), namely country level, industry level, and company level. Four interlinked (diamond) factors could be used for assessing the competitiveness of firms (Porter 1980): factor conditions (inputs used for production, such as labour and capital), demand conditions (customer requirements and sophistications), supporting industries, and firm strategy and rivalry (nature of domestic rivalry).

The Canadian Construction Association Special Committee on Research and Development prepared a proposal to improve the competitiveness of the construction industry in Canada (Revay 1992). In the US, the American Society of Civil Engineers appointed a task committee to assess the new influences that the global economy is exerting on the design and construction communities. It was concluded that the design and construction engineering industry of the US is losing its competitive edge (West 1992). The Construction Industry Institute also examined the factors that affect competitiveness (Yates et al. 1991). Hansen and Tatum (1989) argue that incorporating modern technology into traditional business strategy can assist construction firms in achieving better competitive positions. According to Hansen and Tatum, the US construction market began to lose hold of its share of the gross national product (GNP) during the 1980s. This was due to the fierce competition of foreign firms both domestically and internationally, which Hansen and Tatum believe is the key reason why the US construction industry needed to reevaluate their business practices and adopt technological advances.

Oz (2001) applied Porter's "diamond" framework to develop a competitiveness evaluation framework for the international Turkish construction industry. The framework includes factor conditions, demand conditions, firm strategy and rivalry, and related–supporting industries. Aside from these factors, chance and government play an external role in the dynamics. Ofori (2003) claims that the diamond concept is not applicable to small markets and that those countries may be influenced by governmental controls. Alternatively, Ofori suggests using other methods such as Porter's five forces or Ansoff's product–market matrix to analyze competitive forces and adopt strategies for international construction.

Research objectives and methodology

The main objectives of this research are (*i*) identify factors that can be used to evaluate company competitiveness and market attractiveness along with their relative importance; and (*ii*) solicit industry input regarding best practice to enhance company competitiveness and identify best means, as viewed by industry, to increase the attractiveness of foreign markets to Canadian companies (what needs to be done to increase the global market share of Canadian companies).

The methodology for this research included literature reviews, analysis of the Canadian construction market, interviews, and case studies.

Literature reviews

The research team reviewed relevant literature in the areas of marketing, strategic planning, globalization, and construction marketing and developed a preliminary list of factors to evaluate company competitiveness and market attractiveness. The list included 16 major factors for measuring company competitiveness (along with 48 subfactors) and 11 factors for evaluating market attractiveness (along with 39 subfactors).

Analysis of the Canadian construction market

This stage focused on building a proper knowledge of the current status of the Canadian construction market. This included the collection and analysis of market data and trends (total market value, growth rate, etc.) and an assessment of current legal and economic frameworks relevant to the construction industry.

Interviews

The research team conducted one-on-one interviews with leading experts and executives with construction companies in the Greater Toronto Area (GTA). Considering other areas outside of the GTA was outside the scope of this research project. Because of the large number of factors developed and the subjective nature of many of them, and more importantly the anticipated overlaps between these factors, the re-

search team decided to divide the interviews into two sets. Stepwise analysis and refinement was done after each set.

Initial analysis interviews — In this first set of interviews, we approached 42 experts and interviewed 17. The aim of this first set of interviews was more of a discovery of possible additional factors and a validation of the ones that were developed during the literature reviews. A first round of analysis was conducted to "prune" the proposed factors.

Data collection interviews — This second set of interviews aimed to validate the updated factors, assessing their relative weights and means to measure their performance. It also aimed at soliciting best practice to enhance competitiveness and increase attractiveness. We approached 50 experts and interviewed 14 experts. Appendix A shows the survey guide for the second set of interviews. In each round, we used a Likert scale from 1.00 to 5.00 to every factor, identifying how significant–important they were to either market attractiveness or company competitiveness. A value of 1 indicated that the associated factor possessed little or no significance, and a value of 5 indicated that the factor was highly significant. In both sets of interviews, a balanced representation of three segments of the industry was kept, namely civil, industrial–commercial–institutional (ICI), and housing.

Analytic hierarchy process interviews — Following the second set of interviews, the research team realized that the relative weights of most factors were very close in value (most experts acknowledged that all factors are very important). The team decided to conduct a third round of interviews to explore if we can more accurately pinpoint the relative weights. To this end, we deployed the analytical hierarchy process, which forces experts to rank factors and thus could provide a clearer distinction between the factors. We interviewed eight additional experts in two workshops (four experts in each workshop) to conduct pairwise comparisons of the relative importance of the subfactors.

Case studies

The research team, in collaboration with industrial partners, documented and analyzed four case studies for privatized infrastructure projects. Three of these projects were built in Canada and the fourth was outside of Canada. The aim was to test the relevance and relative importance of the proposed factors.

Evaluating company competitiveness

Through the literature reviews and the first round of interviews, the research team identified seven major factors for measuring company competitiveness. These factors were then the topic of discussion in the second set of interviews. Experts were asked to score the importance of each factor on a scale of 1.00 to 5.00 (with 5.00 being most important). Table 1 shows these factors and their scores. Detailed definition of these factors is provided in Appendix A.

Evaluating market attractiveness

Another seven major factors were identified to assess market attractiveness. Table 2 shows a list of these factors, their subfactors, and their scores. Appendix A gives a brief definition of each of these factors.

Analysis

Results with respect to company competitiveness indicated that the most significant factors were customer satisfaction at 4.70, safety standards at 4.67, cost effectiveness at 4.46, time management at 4.44, and employee satisfaction at 4.38. All segments agreed that the factors possessing the least significance to company competitiveness were legal restrictions at 2.91 and technology sophistication at 2.98.

Sector wise, for the civil segment, the most highly rated factor for company competitiveness was time management at 4.57, and the least rated factor was political issues at 2.29. Likewise for the ICI sector, safety standards was the most highly rated factor for company competitiveness at 5.00, and there were three least rated factors, namely legal restrictions, technology sophistication, and material management, all at 3.33. The housing sector rated quality concerns, safety standards, and customer satisfaction at 5.00, making them the most important, and legal restrictions at 2.25, making it the least important.

Among the top-rated factors (based on average rating) for market attractiveness are projected return on investment at 3.93, financial situation at 3.90, technical expertise at 3.81, economic environment at 3.81, and the position of the competitors at 3.78. The factors representing the least significance to market attractiveness were tax breaks or preferences at 2.51, contingent liabilities at 2.70, technology change at 2.91, and after-sales support at 2.95.

With respect to market attractiveness, the civil sector rated position of competitors as the most significant factor at 3.86 and technology change as the least significant factor at 2.14. The ICI sector, on the other hand, ranked projected return on investments, net profit margin, position of competitors, ease of segment entry, technical expertise, and legal–regulatory compliance all at 4.33, making them the most significant. The ICI sector felt after-sales support, contingent liabilities, and tax breaks were least significant and rated them at 3.00. The housing sector rated existing infrastructure, financial situation, economic environment, and the technological environment as most important at 4.00 and again contingent liabilities and tax breaks as least significant at 2.25.

Application of analytical hierarchy process (AHP)

The analytical hierarchy process (AHP) is a method used to find the relative weights of various elements through pairwise comparisons. Experts are asked to assess the relative importance of one element against another. A scale of 1.00–5.00 is used to rank such relative importance. For example, in Table 3, customer satisfaction is 2.00 times more important than cost efficiency. Likewise, customer satisfaction is 3.00 times more important than time management. On the other hand, safety performance is 1.50 times more important than customer satisfaction.

The research team conducted two workshops, each with four industry experts, to develop the pairwise comparisons. Tables 3 and 4 show the pairwise values for the subfactors in

Table 1. Scores for the subfactors of the seven major factors used to measure company competitiveness.

Subfactor	Civil	ICI	Housing	Avg.	SD
(1) Business environment					
Regulatory restrictions	3.14	4.00	3.50	3.55	0.43
Legal restrictions	3.14	3.33	2.25	2.91	0.58
Environmental issues	2.71	4.00	3.25	3.32	0.65
Social concerns	2.86	3.67	3.75	3.42	0.49
Political issues	2.29	3.67	4.00	3.32	0.91
(2) Production capacity					
Availability of construction inputs	3.57	4.00	2.50	3.36	0.77
Technology sophistication	2.86	3.33	2.75	2.98	0.31
Material management process	3.57	3.33	3.00	3.30	0.29
Time management	4.57	4.00	4.75	4.44	0.39
Cost effectiveness	4.29	4.33	4.75	4.46	0.26
Quality concerns	3.00	4.67	5.00	4.22	1.07
Safety standards	4.00	5.00	5.00	4.67	0.58
(3) Supplier influence					
Suppliers of raw materials, plant, and power	3.14	3.67	4.25	3.69	0.55
Supply of finances	3.86	4.67	4.25	4.26	0.40
Supply of labour	4.00	4.00	4.00	4.00	0.00
Subcontractor relations	4.00	4.67	4.25	4.31	0.34
(4) Corporate management					
Company vision and mission	3.86	4.67	4.25	4.26	0.40
Leadership	4.00	4.33	4.75	4.36	0.38
Organization culture	3.71	3.67	4.25	3.88	0.32
(5) Employees					
Professional skills and competency	3.86	4.67	4.50	4.34	0.43
Employee satisfaction and morale	3.71	4.67	4.75	4.38	0.58
Innovation and research and development	3.43	4.00	3.75	3.73	0.29
Union relations	3.14	3.67	4.00	3.60	0.43
(6) Customer bargaining power					
Type of customer	3.29	4.00	3.25	3.51	0.42
Customer awareness	3.14	3.67	2.75	3.19	0.46
(7) Track record					
Company reputation	4.14	4.33	4.25	4.24	0.10
Company experience	3.86	4.33	4.25	4.15	0.25
Customer satisfaction	4.43	4.67	5.00	4.70	0.29
Relative market share and equity	3.71	4.00	3.50	3.74	0.25

company competitiveness and market attractiveness. The values in Tables 3 and 4 are the averages of the two rounds of workshops (this is why we find values like 1.50 and 2.50).

The next step is to sum all the values in each column (see sample in Table 5) and then divide each cell value by the sum of all values of the column that the cell belongs to. Lastly, we find the relative ranking of each subfactor by adding all the raw values and dividing by the number of columns (in our case 10). Tables 6 and 7 show the final relative weights of the subfactors in both cases. For detailed steps in the AHP, see Saaty (1980).

The use of AHP was very beneficial because it allowed the experts to put the real importance of each subfactor to the test. The general observation that can be made here is that experts gave higher weights to business and managerial (not technical) factors and to longer term (rather than shorter term) factors. For example, in company competitiveness, customer satisfaction received the highest ranking (to quote some experts, "you have to have a reputation of good customer relations"). It was followed by safety record (in essence that "it could tarnish a company reputation" or "increase insurance premiums" or "decrease employee morale"), cost efficiency ("if you cannot compete on prices, you will not gain a sizable market share"), and supply of finance ("you need cash to keep going").

For market attractiveness, long-term stability, as expressed by the return on investment (ROI) throughout the life cycle of the market segment and the overall economic conditions, was the dominant subfactor ("you will be committing resources, people and a lot of effort to get into a new segment, it therefore has to have a sustainable ROI for that to pay back"). In technical subfactors, human expertise was seen as far more important than the hardware requirements.

Table 2. Scores for the subfactors of the seven major factors used to assess market attractiveness.

Subfactor	Civil	ICI	Housing	Avg.	SD
(1) Entrance barriers					
Technical expertise	3.86	4.33	3.25	3.81	0.54
Legal and regulatory compliance	3.00	4.33	3.00	3.44	0.77
Existing infrastructure	3.14	3.33	4.00	3.49	0.45
Financial situation	3.71	4.00	4.00	3.90	0.16
Availability of construction materials	3.14	3.33	3.50	3.33	0.18
Technology change	2.14	3.33	3.25	2.91	0.66
(2) Exit barriers					
After-sales support	2.86	3.00	3.00	2.95	0.08
Contingent liabilities	2.86	3.00	2.25	2.70	0.40
(3) Marketing environment					
Socio-political environment	3.00	3.33	3.00	3.11	0.19
Economic environment	3.43	4.00	4.00	3.81	0.33
Technological environment	3.00	4.00	4.00	3.67	0.58
(4) Sources of competition					
Position of competitors	4.00	4.33	3.00	3.78	0.69
Ease of segment entry	3.43	4.33	3.00	3.59	0.68
(5) Segment life cycle					
Segment growth rate	3.00	4.00	2.50	3.17	0.76
Competitors in the segment	3.71	3.33	2.75	3.27	0.49
Net profit margin of the segment	3.43	4.33	3.25	3.67	0.58
(6) Segment size					
Projected sales (segment)	3.43	3.33	2.75	3.17	0.37
Achievable market share	3.57	4.00	2.50	3.36	0.77
(7) Profitability					
Projected return on investment	3.71	4.33	3.75	3.93	0.35
Tax breaks or tax preferences	2.29	3.00	2.25	2.51	0.42
Total	64.71	75.00	63.00	67.57	

Table 3. Pairwise comparison of company competitiveness subfactors.

		1	2	3	4	5	6	7	8	9	10
Customer satisfaction	1	1.00	0.67	2.00	3.00	1.00	3.00	5.00	4.00	3.50	5.00
Safety performance	2		1.00	1.50	1.50	1.00	2.50	3.00	3.00	2.00	5.00
Cost efficiency	3			1.00	4.00	2.50	2.00	4.50	3.50	1.00	5.00
Time management	4				1.00	0.50	1.00	2.00	0.50	0.33	3.00
Employee morale	5					1.00	1.00	0.50	1.00	0.67	1.00
Leadership	6						1.00	1.00	2.00	1.00	1.00
Professional competency	7							1.00	1.00	0.33	0.50
Subcontractor relations	8								1.00	0.33	2.00
Supply of finance	9									1.00	3.00
Company mission and vision	10										1.00

Three final notes can be recorded here. There was more consistency and agreement on the relative importance of market attractiveness subfactors. The assessment for company competitiveness was less consistent. The privatization of civil infrastructure (especially in international markets) and the shrinking importance of lump-sum contracting (even within government organizations) could be some of the influencing parameters causing a shift towards more business-flavored factors, such as customer satisfaction, finance, and sustainable ROI. Lastly, competition intensity did not receive a high ranking, which could be attributed to the fact that we interviewed mid- to large-size companies and (or) the fact that the market has been booming for the last decade in the GTA.

Status of actual implementation

The discussions during the workshop (and the second set of interviews) included preliminary investigation of the actual implementation–use of the proposed factors in the real world. A full investigation of actual marketing practices is beyond the scope of this study. In general, the aforementioned factors

Table 4. Pairwise comparison of market attractiveness subfactors.

		1	2	3	4	5	6	7	8	9	10
Return on investment in life cycle	1	1.00	1.50	2.00	1.00	3.00	3.00	5.00	3.00	2.00	4.00
Financial requirements	2	0.70	1.00	1.50	1.00	2.00	2.00	3.00	2.00	4.00	2.00
Human–technical expertise	3	0.50	0.70	1.00	2.00	2.00	2.50	3.50	2.00	3.00	1.50
Economic environment	4	1.00	1.00	0.50	1.00	2.00	1.50	1.50	1.00	3.00	1.50
Competition	5	0.30	0.50	0.50	0.50	1.00	0.50	1.00	0.50	2.00	1.50
Net profit margin	6	0.30	0.50	0.40	0.70	2.00	1.00	3.00	3.00	4.00	3.50
Resource–technology requirements	7	0.20	0.30	0.30	0.70	1.00	0.30	1.00	0.50	3.00	2.00
Ease of entry	8	0.30	0.50	0.50	1.00	2.00	0.30	2.00	1.00	1.00	1.00
Existing infrastructure	9	0.50	0.30	0.30	0.30	0.50	0.30	0.30	1.00	1.00	2.00
Legal–regulatory compliance	10	0.30	0.50	0.70	0.70	0.70	0.30	0.50	1.00	0.50	1.00
Column total		5.11	6.75	7.69	8.84	16.17	11.70	20.83	15.00	23.50	20.00

Table 5. Column sums for company competitiveness subfactors.

		1	2	3	4	5	6	7	8	9	10
Customer satisfaction	1	1.00	0.67	2.00	3.00	1.00	3.00	5.00	4.00	3.50	5.00
Safety performance	2	1.50	1.00	1.50	1.50	1.00	2.50	3.00	3.00	2.00	5.00
Cost efficiency	3	0.50	0.67	1.00	4.00	2.50	2.00	4.50	3.50	1.00	5.00
Time management	4	0.33	0.67	0.25	1.00	0.50	1.00	2.00	0.50	0.33	3.00
Employee morale	5	1.00	1.00	0.40	2.00	1.00	1.00	0.50	1.00	0.29	1.00
Leadership	6	0.33	0.40	0.50	1.00	1.00	1.00	1.00	2.00	1.00	1.00
Professional competency	7	0.20	0.33	0.22	0.50	2.00	1.00	1.00	1.00	0.33	0.50
Subcontractor relations	8	0.25	0.33	0.29	2.00	2.00	0.50	1.00	1.00	0.33	2.00
Supply of finance	9	0.29	0.50	1.00	3.00	0.67	1.00	3.00	3.00	1.00	3.00
Company mission and vision	10	0.20	0.20	0.20	0.33	1.00	1.00	0.50	0.50	0.33	1.00
Column total		5.60	5.80	7.40	18.30	12.70	14.00	21.50	19.50	10.10	26.50

Table 6. Relative raw weight and final ranking of company competitiveness subfactors.

		1	2	3	4	5	6	7	8	9	10	Ranking
Customer satisfaction	1	0.18	0.12	0.27	0.16	0.08	0.21	0.23	0.21	0.35	0.19	0.20
Safety performance	2	0.27	0.17	0.20	0.08	0.08	0.18	0.14	0.15	0.20	0.19	0.17
Cost efficiency	3	0.09	0.12	0.14	0.22	0.21	0.14	0.21	0.18	0.10	0.19	0.16
Time management	4	0.06	0.12	0.03	0.05	0.04	0.07	0.09	0.03	0.03	0.11	0.06
Employee morale	5	0.18	0.17	0.05	0.11	0.08	0.07	0.02	0.05	0.03	0.04	0.08
Leadership	6	0.06	0.07	0.07	0.05	0.08	0.07	0.05	0.10	0.10	0.04	0.07
Professional competency	7	0.04	0.06	0.03	0.03	0.16	0.07	0.05	0.05	0.03	0.02	0.05
Subcontractor relations	8	0.04	0.06	0.04	0.11	0.16	0.04	0.05	0.05	0.03	0.08	0.07
Supply of finance	9	0.05	0.09	0.14	0.16	0.06	0.07	0.14	0.15	0.10	0.11	0.11
Company mission and vision	10	0.04	0.03	0.03	0.02	0.08	0.07	0.02	0.03	0.03	0.04	0.04

Table 7. Final ranking of market attractiveness subfactors.

		1	2	3	4	5	6	7	8	9	10	Ranking
Return on investment in life cycle	1	0.20	0.22	0.26	0.11	0.19	0.26	0.24	0.20	0.09	0.20	0.20
Financial requirements	2	0.13	0.15	0.20	0.11	0.12	0.17	0.14	0.13	0.17	0.10	0.14
Human–technical expertise	3	0.10	0.10	0.13	0.23	0.12	0.21	0.17	0.13	0.13	0.08	0.14
Economic environment	4	0.20	0.15	0.07	0.11	0.12	0.13	0.07	0.07	0.13	0.08	0.11
Competition	5	0.06	0.07	0.07	0.06	0.06	0.04	0.05	0.03	0.09	0.08	0.06
Net profit margin	6	0.06	0.07	0.05	0.08	0.12	0.09	0.14	0.20	0.17	0.18	0.12
Resource–technology requirements	7	0.04	0.05	0.04	0.08	0.06	0.03	0.05	0.03	0.13	0.10	0.06
Ease of entry	8	0.06	0.07	0.07	0.11	0.12	0.03	0.10	0.07	0.04	0.05	0.07
Existing infrastructure	9	0.10	0.04	0.04	0.04	0.03	0.02	0.02	0.07	0.04	0.10	0.05
Legal–regulatory compliance	10	0.05	0.07	0.09	0.08	0.04	0.02	0.02	0.07	0.02	0.05	0.05

are somewhere between subjective best practices and formal analysis tools that are considered during marketing decisions. The following was concluded from these discussions: (*i*) marketing practices are more rigorous in large organizations; (*ii*) in general, the outlines of a marketing strategy are set at the higher levels of organization and normally include the selection of market segments, geographical locations, product mixes, and market entry strategies (such as acquisition and alliance); in many organizations, this is done through consultants who compile data and explore market potential; (*iii*) large housing contractors (and developers) seem to have more established marketing practices, which could be a reflection of the fact that their products are related to private consumers, where a wealth of information and established theories and practices provide effective means for conducting comprehensive market analysis; (*iv*) merger and acquisition activities are expected to increase in the market as European and US companies eye the Canadian market; on the other hand, several Canadian companies are interested in the US market (with its larger size); (*v*) although the factors articulated in this article are the most frequently considered, the relative weights of the factors may vary in relation to the segment being considered, the targeted region, and the overall economic situation; (*vi*) there is little or no rigorous process for tracking organizational knowledge regarding these factors (such as their trends, lessons learned, and benchmarks); (*vii*) companies that are doing business outside Canada (especially those which export manufactured products) are very interested in the fairness and adequacy of trade agreements; (*viii*) access to finance (mainly through collaboration with banks) and personnel qualities (especially leadership and knowledge of modern technology as it relates to virtual and extended organizations) are gaining more importance for companies that are undertaking construction work outside Canada (especially privatized work); and (*ix*) the fundamental common factor that would help all contractors increase their competitiveness is the quality of construction personnel (in terms of their technical knowledge and productivity awareness of modern technology).

Case studies

To gain more understanding of the actual use of the aforementioned factors, the research team conducted four case studies. Appendix B shows some background information about one case: Highway 407 in Ontario. The project presents a completely new local market segment for construction companies that had to work closely with developers and operators. We present here an abstract of the case study that focuses on the risks associated with the project and the financial arrangements, two issues of great importance in evaluating market attractiveness.

Of course full information about marketing decisions was not revealed to the research team, but anecdotal evidence suggests that the most important factors in deciding the competitiveness of contractors in this type of projects were access to finance and relevant expertise. This again highlights the need for rigorous collaboration between contractors and banks in privatized projects. Relevant expertise refers not only to technical expertise in roadway building, but also, and more importantly, to risk analysis, project coordination, and public relations. Such business and management expertise was instrumental in negotiating the contract, achieving a conducive work environment for the project team, and the overall management of project risks.

In addition to clear financial gains, the promise of a new, potentially fast growing market segment and the potential of establishing a fast market share were the major factors in determining the attractiveness of this project to many organizations. On the other hand, project risks (during construction and operations) and the novelty of the project delivery system in Ontario were the major factors that could have reduced the market attractiveness for some contractors.

From local markets to global markets

With deregulation becoming the lingua franca of business around the world, the global construction market is growing. It is estimated that by the year 2020, about 65% of all new infrastructure projects will be outside North America (CERF 2001). A good portion of these infrastructure systems will be executed through privatized means. Despite the growing number of public–private infrastructure (PPI) projects all over the world, Canadian construction firms have been slow to take advantage of new opportunities in the global market. It is estimated that only 1% of total Canadian construction revenues come from exports (US Department of Commerce 2000). The few Canadian construction contractors that are successfully working offshore have technical expertise in the energy, transportation, telecommunications, and environmental sectors. The high level of investment and risk associated with PPI projects and the relatively small size of Canadian construction firms have kept many of them from accessing these opportunities.

Global competition necessitates shorter development times. This emphasizes the need for a "time to market" mentality in the organizational culture of Canadian contractors. In traditional manufacturing, time to market means shorter development cycles of new products. In construction it relates to the speedy and timely acquisition–reshaping–reengineering of organizational resources (including human, financial, and physical) to enter a market at *the right time* with the *right product mix*. As a case in point for entry at the right time, one can look at the rapid growth of Canadian contracting organizations in the Mexican market. Since the beginning of the 1990s, Mexico has negotiated some 30 free-trade agreements, putting it in an enviable international business position, where gross domestic product (GDP) has risen from US$330 billion to US$618 billion between 1996 and 2001, and the inflation rate fell from 27.7% to 4.4% in the same period. Carefully analyzing the market conditions and the political environment of the Mexican market allowed several Canadian contractors a speedy entry in the market (Mercadex International Inc. 2003).

Equally important is to offer the right product once in a new market. As an example, the Canada Mortgage and Housing Corporation (CMHC) study by Mercadex International Inc. (2003) clearly indicated typical Canadian products need to be changed to suit the local market. This includes manufactured products (such as doors and windows) that have to adhere to local codes and environments and constructed products that have to be offered in a manner

suitable to the local cultural, economic, and environmental conditions. For example, although the highest quality products are seen as a major factor in gaining market share in Canada, such products may not be suitable for all market segments in other countries.

Similarly, contractors have to adapt to local market conditions and be able to enter new markets as they open. Very often when a developing country embraces economic reforms, a step-by-step policy is used that could start with privatization of the electrical infrastructure followed by telecommunication systems and then maybe highway construction and operations. In many cases, countries have also privatized water and waste-water infrastructure. A contractor should be able to reorganize its resources and strategies to expand to such new segments as economic reforms progress. In the same vein, as reforms progress, countries could experiment with more advanced privatization schemes, i.e., move from a build–operate–transfer (BOT) or build–own–operate–transfer (BOOT) system to full concessions. Contractors should be able to quickly partner with lenders to offer a new privatized product that matches the progress in reform.

Best practice for achieving competitiveness

Industry experts identified the following best-practice strategies for enhancing company competitiveness.

Customer focus

To an extent, construction is a service industry, which makes customers the ultimate judges of company competitiveness. The company should focus on targeting customers who appreciate (are most in need of) the value added that the firm can provide along with the physical product or service. This is especially prudent given the changing face of industry customers (CERF 2001), i.e., sustainability oriented, mostly nongovernmental, and technologically sophisticated. In other words, customers are looking beyond the regular (physical) products. They demand additional features such as the ability to deal with change, a willingness to partner with the owner, knowledge of constructability, safety practice, and green construction practice.

Employee focus

The leaders of the construction firms must realize that every employee is part of the marketing effort. One expert indicated that "Happy employees who feel wanted are assets. Unhappy employees who are kept in the dark are liabilities." Lack of communication is a major cause of employee apathy. For better employee satisfaction, it is imperative to perform internal assessments of attitudes and expectations of the people working in the company. Training and development is also an important aspect of employee satisfaction and company performance.

Continuous improvement

The ever-changing construction industry mandates a strong commitment to continuous improvement. An integral part of continuous improvement is to instill an achievement and performance measurement culture within the organization. Using performance indicators, it can be shown to every employee and stakeholder that the organization is making progress towards its goals. Goals and objectives need to be further supported by accountability and by the use of mileposts, time frames, and other indicators of success.

Benchmarking is yet another important tool to improve performance. This is a process of continuous measurement and comparison of an organization's business process against business leaders anywhere in the world to gain information that will help the organization to take action to improve its performance. Benchmarking is a positive, proactive process that can change business operations in a structured fashion to achieve superior performance. The process provides a management tool for measuring and comparing any part of an organization's operation, product, or service against the best, which will lead to superior performance on a continuous basis.

Create economies of scale or experience

Organizations should embrace a business strategy allowing for the creation of an extended organization. This should include a set of partnering agreements with suppliers and subcontractors, alliances with developers and specialty contractors, and joint ventures with competitors and banks. The dynamic creation of flavors allows organizations to draw on the expertise of their partners and thereby assure sufficient economies of scale that allows them to compete in a variety of projects (with varying degrees of risks). In a modern knowledge economy, this allows organizations to acquire necessary human capital as needed and in an efficient way (Ambastha and Momaya 2004).

Process reengineering provides the means for assuring effective extended organizations. It allows for decentralized decision making. It also allows for a dynamic and fast creation of virtual organizations that exist to achieve a project, which then can be easily dismantled (Bing et al. 1999), and enhances communication among teams within the virtual organizations. Investment in knowledge and information management is key for achieving a more efficient extended organization (Mahmoud-Jouini 2000).

Organizational culture

In the new knowledge economy, softer issues are assuming a more important role than harder issues (Desphandé and Webster 1989; Schein 1999). Organizations have to put in place systems to allow individuals to identify, search for, and use proper information at the proper point of the workflow. As knowledge becomes more specialized and problems become more complex, knowledge sharing among stakeholders is becoming a necessity and a source of competitiveness. This includes not only explicit knowledge, but also, and more importantly, implicit knowledge (something we may know but are hesitant to share) and tacit knowledge (something we know but cannot express) (Baumard 1999). This is giving rise to "personalization strategies" over "codification strategies" (Hansen et al. 1999). In this context, knowledge is not merely a psychological phenomenon (an entity held in the mind of an individual). Rather, knowledge is more of a social phenomenon held collectively among groups of individuals or knowledge communities.

Situated cognition or organizational learning (OL) presumes that knowledge cannot be separated from its practice and the social relations (Gold and Watson 1999). OL has be-

come a primary technology for creating "enterprising selves" among employees, with a focus on eliciting flexibility, responsiveness, and innovation. Employees become enterprising, seeking betterment and fulfillment in the work context (Garrick and Usher 2000). Knowledge organizations empower individuals as self-responsible choice makers. Strategies for motivating workers to share their knowledge are increasingly being used. For example, the same incentives of research scientists were offered to sales representatives to motivate them in sharing knowledge (Duguid 2000). By sharing their tips, service representatives could build their status within the company. Similar strategies for linking knowledge to values and trust are being implemented (Stafford 2001).

Through the culture of knowledge, organizations can achieve some of the following:

Best of breed — Firms have to instill a culture for harnessing best of breed solutions in construction technology, human capital, project development processes, and project finance schemes to be able to compete.

Dynamic organizations — Organizations need to concentrate on core competence and reinvent their offerings by reconfiguring its virtual enterprises per project. More importantly, organizations have to master the capabilities and vision to lead–adapt to changes as they occur in the market.

Shorter product cycles — Organizations need to emphasize developing mechanisms to sustain an organization's agility through conducting research into human factors in organization dynamics, innovative process patterns, and decentralized decision-making.

Trade agreements

Despite the North American Free Trade Agreement (NAFTA) and the upcoming Free Trade Agreement of the Americas (FTAA), market entry to the US or Latin America may be impeded by local regulations, technical requirements, product standards, and discriminatory processes favoring local contractors. Canadian construction contractors may also be inhibited by the substantial up-front costs involved in bidding on FTAA projects or establishing a presence in these markets. To overcome these obstacles, contractors should consider partnering or joint venturing with local contractors. More importantly, and as we approach the FTAA, the Canadian government should substantiate the interests of Canadian contractors in the new open market and support their involvement.

Conclusions

Market attractiveness and company competitiveness are of great significance to construction companies in today's dynamic business environment. The objectives of this study are (*i*) to understand and examine the factors for market attractiveness and company competitiveness of the Toronto construction industry; and (*ii*) to formulate a set of guidelines (recommendations) to enhance the market attractiveness and company competitiveness of the various construction firms in Toronto and the Greater Toronto Area (GTA).

The research team interviewed 39 experts in mid- to large-size companies in the GTA. The following seven major factors were identified as measures for company competitiveness: business environment, production capacity, supplier influence, corporate management, employee skills and morale, type of company customers, and company track record. Seven other factors were identified as measures for market attractiveness: entrance barriers, exit barriers, market environment, competition, segment life cycle, segment size, and profitability.

The research team also developed a set of subfactors to help assess these major factors. To pinpoint the relative importance of these subfactors, we used the analytical hierarchy process. The most fundamental subfactors were found to be customer satisfaction, safety record, cost efficiency, and supply of finance in the case of company competitiveness. In the case of market attractiveness, the most important subfactors were sustainable return on investment (ROI), financial requirements, human capital–expertise, and overall economical conditions.

References

Ambastha, A., and Momaya, K. 2004. Competitiveness of firms: review of literature of theory, framework and models. Singapore Management Review, **26**(1): 45–61.

Arditi, D., and Davis, L. 1988. Marketing of construction services. ASCE Journal of Management in Engineering, **4**(4): 297–315.

Baumard, P. 1999. Tacit knowledge in organizations. Sage Publishers, Thousand Oaks, Calif.

Bing, L., Tiong, R.L., Fan, W.W., and Chew, D.A. 1999. Risk management in international construction joint ventures. ASCE Journal of Construction Engineering and Management, **125**(4): 277–284.

CERF. 2001. The future of the design and construction industry. Civil Engineering Research Foundation (CERF), ASCE, New York, N.Y.

Desphandé, R., and Webster, F.E. 1989. Organizational culture and marketing: defining the research agenda. Journal of Marketing, **53**(January): 3–15.

Duguid, P. 2000. Balancing act: how to capture knowledge without killing it. Harvard Business Review, **78**(3): 73–80.

Garrick, J., and Usher, R. 2000. Flexible learning, contemporary work and enterprising selves. Electronic Journal of Sociology, **5**(1): 1–15.

Gold, J., and Watson, S. 1999. Exploring the dark sides of learning: a communities of practice perspective. *In* Researching Work and Learning: Proceedings of the 1st International Conference, Leeds, UK, 10–12 September 1999. *Edited by* K. Forrester. School of Continuing Education, University of Leeds, Leeds, UK. pp. 198–206.

Hansen, K.L., and Tatum, C.B. 1989. Technology and strategic management in construction. ASCE Journal of Management in Engineering, **5**(1): 67–83.

Hansen, M., Nohria, N., and Tierney, T. 1999. What's your strategy for managing knowledge? Harvard Business Review, **77**(2): 106–116.

Harchaoui, T.M., Tarkhani, F., and Warren, P. 2003. Public infrastructure in Canada. Prepared for Infrastructure Canada by Statistics Canada, Ottawa, Ont.

Industry Canada. 2000. Key statistics on ICT infrastructure, use and content. Industry Canada, Ottawa, Ont.

Kotler, P., and Armstrong, G. 1991. Principles of marketing. Prentice Hall Inc., Englewood Cliffs, N.J.

Loke, H. 2002. Credit rating report: 407 International Inc. Dominion Bond Rating Services Limited (DBRS), Toronto, Ont.

Mahmoud-Jouini, S. 2000. Innovative supply-based strategies in the construction industry. Construction Management and Economics, **18**(6): 643.
Mercadex International Inc. 2003. Exporting to Mexico: lessons learned from the Canadian housing industry. Prepared for the Canada Mortgage and Housing Corporation (CMHC) by Mercadex International Inc., Montréal, Que.
Momaya, K. 1996. International competitiveness of the Canadian construction industry: a comparison with Japan and the United States. Ph.D. thesis, University of Toronto, Toronto, Ont.
Offering Memorandum. 1997. Offering Memorandum–Greater Toronto Airports Authority. CIBC World Markets, DCM Division, Toronto, Ont.
Ofori, G. 2003. Framework for analyzing international construction. Construction Management and Economics, **21**(4): 379–391.
Oz, O. 2001. Sources of competitive advantage of Turkish construction companies in international markets. Construction Management and Economics, **19**(2): 135–144.
Porter, M.E. 1980. Competitive strategy. The Free Press, New York, N.Y.
Revay, S. 1992. A proposal to augment the competitiveness of the construction industry in Canada. Canadian Construction Association, Ottawa, Ont.
Saaty, T.L. 1980. The analytic hierarchy process. McGraw Hill, New York, N.Y.
Schein, E.H. 1999. The corporate culture survival guide: sense and nonsense about culture change. Jossey-Bass, San Francisco, Calif.
Stafford, S.P. 2001. Epistemology for sale. Social Epistemology, **15**(3): 215–230.
US Department of Commerce. 2000. Canada construction contracting industry. US Department of Commerce, National Trade Data Bank, Washington, D.C.
West, R. 1992. Improving international competitiveness. ASCE Journal of Professional Issues in Engineering Education and Practice, **118**(2): 107–112.
Yates, J., Mukherjee, S., and Njos, S. 1991. Anatomy of construction industry competition in the year 2000. Source Document 64, Construction Industry Institute, Austin, Tex.

Appendix A: Survey guide

The objectives of this study are (*i*) to identify factors that can be used to evaluate the market attractiveness and company competitiveness, and (*ii*) to formalize a set of guidelines for enhancing company competitiveness and fostering market attractiveness.

Company competitiveness

(1) *Business environment* consists of all forces that affect the company's businesses within the industry.

- *Regulatory restrictions* — ability to meet any restrictions on company activity by technical specifications and codes.
- *Legal restrictions* — ability to satisfy restrictions imposed by the juridical environment such as licensing requirements.
- *Environmental concerns* — ability to handle environmental assessment issues and requirements.
- *Social concerns* — ability to address issues sensitive to the local citizens.
- *Political issues* — impacts of the high profile and political status a company may have on its competition.

(2) *Segment production capacity* relates to the ability to sustain company operations in a segment.

- *Availability of construction inputs* — refers to the availability of resources (such as raw materials and size of manufacturing plants).
- *Technological sophistication* — level and sophistication of production plant and processes.
- *Material management process* — refers to the upkeep of inventory and the system of inbound–outbound logistics.
- *Time management* — identifies the company's ability to regularly complete a product within its designated schedule.
- *Cost effectiveness* — identifies the company's ability to produce a product that possesses a high quality to cost (quality/cost) ratio.
- *Quality concerns* — level of product quality with respect to customers and competitors alike.
- *Safety standards* — refers to adherence to safety standards, training for safety, and safety strategy.

(3) *Supplier influence* considers the company's relationship with the suppliers.

- *Suppliers of raw materials, plant, and power* — a major share of the cost of construction projects is traced to materials and services supplied from outside.
- *Supply of finances* — considers the company's ability to access a large amount of finances to invest in a given segment.
- *Supply of labour* — identifies the accessibility of skilled labour in a given segment and the participation of unions to produce a product.
- *Subcontractor relations* — the quality of subcontractors and the company's power over them.

(4) *Corporate management* is concerned with the process of planning, organizing, directing, and controlling organization behaviors to accomplish a mission.

- *Company vision and mission* — clarity and employee buy-in of organizational mission.
- *Leadership* — the quality of upper management team in planning, motivating, and controlling operations.
- *Organization culture* — levels of integration between different units of the organization (cross-functional relations), and levels of transparency and resistance of the employees in adapting to new technology or process.

(5) *Employees*

- *Professional skills and competency* — refers to the employee mix of expertise.
- *Employee satisfaction* — level of satisfaction experienced by the individual.
- *Innovation and research and development* — support for innovation and new technology.
- *Union relations* — the level of cooperation and teamwork between an organization and its labour unions.

(6) *Customer bargaining power* refers to the buyers' or customer's ability to affect company profits.

- *Type of customer* — type of owners associated with a segment (i.e., federal–provincial government, municipal government, corporate, or private).
- *Customer awareness* — refers to customer's awareness–demands for performance-related factors, such as quality standards, time management, green design, and best construction practice.

(7) *Track record*
- *Company reputation* — reputation within the segment with respect to customers and competitors alike.
- *Company experience* — length of time spent in the segment providing the same or similar product.
- *Customer satisfaction* — level of customer satisfaction with the quality of service provided.
- *Relative market share and equity* — the size of the existing segment share occupied by the company.

Market attractiveness

(1) *Entrance barriers* refers to ease of entering a segment.
- *Technical expertise* — the technical knowledge, expertise, and know-how required in starting a business in a particular segment.
- *Legal and regulatory compliance* — ease–difficulty of attaining required licensing.
- *Existing infrastructure* — considers the surrounding infrastructure (i.e., highways, power, water, etc.) required to perform work in a given geographic area.
- *Financial situation* — considers the finances required to operate in a given segment such as required capital, average return on investment, and sensitivity to interest rates.
- *Availability of the construction materials* — refers to the availability of labour, power, equipment, and raw materials required by the company to function in a geographical area.
- *Technology change* — refers to the technology–procedures required to implement a product.

(2) *Exit barriers*
- *After-sales support* — refers to length and intensity of warranty, insurance, and maintenance requirements.
- *Contingent liabilities* — refers to the likelihood of post-construction litigations and the period of performance bonds.

(3) *Marketing environment* refers to macroscopic factors that affect management's ability to develop and maintain successful relationships with its target customers.
- *Socio-political environment* — status of laws, government agencies, and pressure groups that influence and limit various organizations and individuals in a given society.
- *Economic environment* — refers to all economic variables that have an impact on the next planning cycle, such as spending patterns, economic growth, interest rates, unemployment rate, and growth of key industries.
- *Technological environment* — pace of new technologies that can revolutionize the delivery process.

(4) *Sources of competition* considers the intense competition between companies in the same segment.
- *Position of competitors* — refers to the structure and competence level of competitors.
- *Ease of segment entry* — refers to history and ease of entry in the segment.

(5) *Segment life cycle* refers to long-term stability and potential of the segment.
- *Segment growth rate* — the pattern of segment growth in terms of size, including future demand.
- *Competitors in the segment* — stability and number of competitors in the segment.
- *Net profit margin of the segment* — identifies the likely return of the potential profit margin, based on past performance.

(6) *Segment size* includes the unit size of the segment and the amount of money (dollars) spent in the segment.
- *Projected sales (segment)* — an estimate of revenue from the segment.
- *Achievable market share* — identifies the size of the segment share that can be occupied by the company when it comes into the market.

(7) *Profitability* refers to the earnings before interest and tax and can be measured in terms of projected return on investment and tax breaks or tax preferences.
- *Projected return on investment* — the net income divided by the total investment.
- *Tax breaks or tax preferences* — denotes the special tax treatment that may be available to one type of project versus another.

Survey questions

Company competitiveness

(1) Please rate the relative importance of the following factors–subfactors in evaluating company competitiveness.

(2) Please add any additional subfactors that you may consider important.

(3) Please identify strategies–actions that can be used by companies to enhance their competitiveness. Could you provide sample cases on the use of these strategies?

Market attractiveness

(4) Please rate the relative importance of the following factors–subfactors in evaluating market attractiveness.

(5) Please add any additional subfactors that you may consider important.

(6) Please identify strategies–actions that can foster–increase the attractiveness of construction markets. Could you provide sample cases on the use of these strategies?

Appendix B: Case study of the Highway 407 express toll route

The Highway 407 express toll route (ETR) is the world's first all-electronic, open-access, toll highway. It is 108 km long and runs across southern Ontario's busiest and highly industrialized corridor, connecting major centres in the Greater Toronto Area (GTA). In 1993, the Province of Ontario established the Ontario Transportation Capital Corporation (OTCC) for the purpose of overseeing the design, construction, operation, maintenance, management, and financing of Highway 407. In that same year, the OTCC awarded the right to design, construct, operate, and maintain the Highway 407 central segment to Canadian Highways International Corporation (CHIC), a private infrastructure development company, at a fixed price of CAN$929.8 million. Highway 407 central was opened to traffic in June 1997 and commenced tolling as the world's first all-electronic, open-access toll highway in October 1997.

This is a build–operate–transfer (BOT) project that has a 99 year lease agreement (Offering Memorandum 1997). In 1999, the Province of Ontario and 407 International Inc. en-

tered into a share purchase agreement, pursuant to which 407 International Inc. acquired all of the issued and outstanding shares of the concessionaire for a purchase price of CAN$3107 million. 407 International Inc. is authorized to establish, collect, and enforce payment of tolls at 407 ETR. The company is obliged to manage, maintain, repair, and toll the 407 ETR and design and construct the Highway 407 central deferred interchanges, west extension, and east partial extension. The sale of the 407 ETR represents the largest privatization in Canadian history.

407 International Inc. entered into a design–build agreement for the construction of Highway 407 west extension and the 407 east partial extension for a fixed price of CAN$422 254 830, with a joint venture of Ferrovial-Agroman International (a subsidiary of Grupo Ferrovial[3]) and SNC-Lavalin.

Significant risk factors

The significant risk factors identified during the privatization process are given in the following subsections.

Traffic volume and toll revenues risk

The 407 ETR traffic volume depends on a wide variety of factors, many of which are not within the control of the company. Future traffic on Highway 407 may be affected by the growth in the population and the economy of the GTA, and the construction of competing transportation infrastructures. Therefore, "demand potential" is the most dominant risk for the 407 ETR.

At this time, the growth in traffic has exceeded the forecasted levels. The total number of workday trips and total monthly trips has grown steadily year-over-year since the opening of the highway. On 11 October 2004, a new 1 day record of 367 273 trips was set on the 407 ETR. Users have exhibited very little sensitivity to prices since the company raised peak toll rates by 15%, and off-peak toll rates by considerably higher percentages, and increased surcharges and other fees with no discernible effect on usage. Total revenues for 2001 were 12% higher than the Dominion Bond Rating Service (DBRS) adjusted forecast revenues from Halcrow Fox[4] (Loke 2002), and results indicate a strong continued ability to meet or exceed forecast demand for future periods.

The demand for the 407 ETR is at risk, however, of being adversely affected by certain uncontrollable factors. For example, the Province of Ontario has not covenanted, or otherwise indicated, that it will refrain from constructing roads, highways, or transit systems that may be in direct competition with the 407 ETR. Construction of any competing transportation infrastructure can have a severe effect on the 407 ETR traffic revenues.

Construction risks

407 International Inc. faced the usual construction risks in the development of the 407 west extension, the 407 east partial extension, and the 407 central deferred interchanges. 407 International Inc. used a fixed-price contract, with adequate provisions for liquidated damages, to transfer construction risks to the project contractors.

Tolling technology risk

The 407 ETR is the first and only roadway in the world that relies exclusively on electronic toll collection. Technical difficulties or failure of the technology could severely affect the toll road revenues. 407 International Inc. took the following steps to mitigate technology risk: (*i*) the company required the technology providers to give a 1 year limited warranty for the toll system; (*ii*) the company entered into a toll system "Operating, maintenance, management, marketing and rehabilitation agreement" with technology providers; and (*iii*) the project has a CAN$250 million all-risks insurance to cover the cost of required repairs and any consequent lost toll revenues.

Operating and maintenance expenses

Actual costs and expenses could vary from those projected by the company and may result in reduced profitability. Estimates for these expenses were developed based on many assumptions, some of which are not under the control of the owner (e.g., costs of services and equipment, regulatory requirements).

Regulatory approvals

The 407 ETR project required numerous regulatory approvals and permits. The applications for many of these approvals require the preparation of extensive documentation and consultation with regulatory agencies. The approval timings for these permits–approvals cannot be guaranteed and thus pose a significant risk.

Economic risks

407 International Inc. purchased the highway by acquiring bridge loans[5] at floating rates. To hedge the risk of change in interest rates, it entered into swap agreements.[6]

Environmental risks

The 407 ETR is built in accordance with provincial environmental standards, and environmental risks have been analyzed and managed in a reasonable manner. Substantial efforts were dedicated to this risk element, however, to assure the public of the need and viability of the project.

Political risks

Political risks seem to be minimal for the project, as it enjoys strong political support, and there is general political stability in Canada.

[3] A leading Spanish construction company.
[4] An independent provider of infrastructure services that supplies traffic forecasts for the 407 ETR.
[5] A short-term loan acquired by a company until it can secure permanent financing.
[6] A deal between banks or companies where borrowers switch floating-rate loans for fixed-rate loans in another country. These can be either the same or different currencies. The advantage to this is that one company may have access to lower fixed rates and another may have access to lower floating rates, therefore encouraging trade.

Financial arrangements

The project's initial finance was CAN$4 billion, of which the total initial debt was CAN$3.35 billion (83.75%) and the total initial equity was CAN$650 million (16.25%). Of these funds, CAN$3.1 billion was paid to the Province of Ontario to defray acquisition costs, CAN$500 million for construction of the east and west extensions, and CAN$400 million for debt servicing and working capital.[7]

Initially, all debts were in the form of bridge credit facilities[8] from different banks. The interest rates for bridge facilities are typically higher because they include a spread over the banker's acceptance rate.[9] After 407 International Inc. was confirmed as the successful bidder, it issued bonds at fixed interest rates. Another significant consideration in this regard is that banks typically do not issue debt for more than 5 years (even at floating interest rates) due to the excessive capital costs involved, whereas bonds can be issued with a maturity period of typically up to 30 years. In funding the acquisition of all shares of the highway from the Province of Ontario, 407 International Inc. used the tools listed in the following subsections.

Senior bridge[10] credit facility

Loans of CAN$2.3 billion were advanced by a syndicate of 13 Canadian and foreign banks. The senior loan was secured by a CAN$2.5 billion bond issue. 407 International Inc. supported its obligations for interest payment by delivering irrevocable letters of credit.[11] This was arranged by the subordinated lenders in an aggregate amount of CAN$200 million, establishing a segregated series reserve account[12] in the amount of CAN$20 million for the benefit of the senior bank lenders only. The company also entered into swap agreements to hedge the floating interest rate risk.

Junior bridge credit facility

Loans of CAN$150 million were advanced by a Canadian chartered bank. The junior loan was secured by a CAN$300 million bond issue. 407 International Inc. supported its obligations for interest payment by delivering irrevocable letters of credit, arranged by the subordinated lenders, with an aggregate amount of CAN$54 million, and entering into swap agreements to hedge the floating interest rate risk.

Subordinate[13] credit facility

CAN$775 million credit facilities (including letters of credit available for drawdown[14]) were made available by the subordinated lenders, with CAN$125 million subordinated convertible debenture[15] maturing on 31 December 2045.

Equity

The project used CAN$650 million in equity. Over time, 407 International Inc. is repaying its bridge credit facilities by issuing bonds in capital markets. Also, 407 International Inc. committed to convert convertible debentures to equity (shares) in 2002.

[7] Current assets minus current liabilities. The working capital ratio is current assets divided by current liabilities.
[8] Same as a bridge loan.
[9] The interest rate for a short-term investment created by a nonfinancial firm and guaranteed by a bank to make payment.
[10] A short-term loan that is used just until a person or company can secure permanent financing.
[11] A letter from a bank that guarantees that a buyer's payment to a seller will be received on time and for the correct amount.
[12] A type of reserve account.
[13] A loan (or security) that ranks below other loans (or securities) with regard to claims on assets or earnings.
[14] Reduction in account equity from a trade or a series of trades.
[15] A debenture is an unsecured debt backed only by the creditworthiness of the borrower. There is no collateral, and the agreement is documented by an indenture. A convertible debenture is a type of debenture that can be converted into some other security.