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The locus of control: a determinant of opportunistic behaviour in construction health and safety

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Current research and practice in the field of risk management focus almost exclusively on the downside of risk, meaning that many opportunities for improved performance go unmissed. There is substantial evidence that opportunities demand a different management approach to problems and, that there is need to better understand this process. However, our understanding of opportunism has been hindered by the absence of research into the main forces that impede and drive opportunistic behaviour. This paper explores these forces and investigates one in particular – the locus of control (self perceived influence over decision-making). This investigation is conducted in a health and safety context because this is an area of particularly poor performance in the construction industry, where the locus of control is especially relevant. The paper concludes that the overall locus of control is high in relation to health and safety issues. However, there is considerable discrepancy in perceived levels of influence between different occupational, gender and ethnic groups, which need to be addressed if the industry is to improve its performance in this area.

Keywords: Opportunity management, risk management, behaviour, locus of control, empowerment, health and safety, gender, culture, discrimination

Introduction

The subject of risk management has received considerable attention in the construction industry, although practices are widely accepted as being primitive compared to other industries (Chicken, 1994; Edwards, 1995; Byrne, 1996; Flanagan and Norman, 1996; Chapman and Ward, 1997; Loosemore, 2000; Smith, 2000). With spiralling insurance premiums following September 11th, the collapse of insurance giants like HIH in Australia and Independent Insurance in the UK and the financial reporting debacle in the US, many construction companies have been forced to review their risk management practices. Most organizations now face a stark choice of either systematically managing their risks or being driven out of business by increasing insurance and finance costs (Lawson, 2002). While this new emphasis on risk management is welcome, it could also distract attention from the pressing need to encourage a more opportunistic mentality in the construction industry. While many authors of risk management see the concept of risk having both an upside and downside, the focus is heavily on managing the downside (or problems) (Loosemore, 2000). As Bowden *et al.* (2001, p. xv) points out, 'the growing attention to "risk" does not appear to be inspired by the profit enhancing opportunities that risk management practices offer; rather it is driven by the apprehension associated with the negative perception of risk'. Indeed, one needs to look no further than the vocabulary of risk management in the construction industry for an illustration of this. For example, while many risk management systems distinguish between risks and opportunities, a common way of classifying the consequences of risks is to use a scale ranging from insignificant to catastrophic. While this may suit the management of problems, the idea of a catastrophic opportunity makes no sense. Indeed, even

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Bowden *et al.* (2001), who are cited above as acknowledging the downside focus of current risk management practices, advocate the same scale. Furthermore, the majority of literature in risk management is based on the debatable assumption that opportunities and problems deserve identical management strategies. This is reflected in the techniques proposed for managing risks, which are primarily designed to *avoid* and *mitigate*, whereas in dealing with opportunities, there is a need to do precisely the opposite.

This negative focus has been recognized by Chapman and Ward (2002) and it is likely to be one of the main reasons why the construction industry's performance lags behind that of other industries in so many areas. It ensures that the industry's traditional practices create far less pressure to identify and respond to opportunities than to problems, which means that many potential opportunities to improve performance go unexploited. To address this problem there is a need to better understand the impediments and drivers of opportunistic behaviour in the construction industry. This is the aim of this paper. The objective is to begin exploring these forces in detail in order to help managers refocus on the upside of risk and thereby take advantage of the many unexploited opportunities that surround them.

Impediments to opportunism

While there have been few dedicated investigations into opportunity management in the construction industry, there is some research that provides useful insights into the main impediments to opportunism. In essence, these can be grouped under two main headings, namely *manmade* and *institutional*.

Manmade impediments

Manmade impediments are those created by the construction industry's managerial practices. These were noted by Latham (1994) who found that a culture of confrontation, mistrust and individualism pervades the construction industry, producing an environment of mediocrity with little incentive to seek opportunities to improve performance. Others have found that the roots of this culture lie in the myriad of complex, legalistic and voluminous contracts, which distribute risks ambiguously and inequitably in construction projects (Barnes, 1989, 1991; Uff, 1995; Hancock and Root, 1996). This is partly related to the hierarchical, class-based and occupationally divided structure of the construction industry that limits opportunities for the full use of organizational knowledge (Newcombe, 1994). Newcombe argued for the breaking down of traditional occupational barriers and for flatter organizations that are receptive to more participate management styles. This would improve communication and provide greater opportunities for knowledge to flow more freely, thus enabling project participants to more fully identify and explore different opportunities. Poor communication in the construction industry has been exacerbated by the growth of sub-contracting (NEDO 1983, 1988). With the growth of sub-contracting have come fragmentation, instability, short-termism, reduced customer orientation and problems of communication, co-ordination, motivation and quality control. These problems have had the effect of focussing peoples' mind on avoiding the potentially adverse effect of risk rather than maximizing its potential benefits.

Institutional impediments

Institutional impediments to opportunism are those that are created by external institutional bodies or which are imbedded in the industry's culture as a result of its historical development. For example, Bowden *et al.* (2001) argues that the negativity of current risk management practices largely derives from the increasing amounts of risk-related legislation that seeks to control business activities and from the well-published cases of heavy fines and even imprisonment for corporate directors for regulatory compliance breaches. There are also the huge losses incurred by insurance underwriters for environmental incidents and an increasing incidence of shareholder and community protests against perceived complacent and arrogant behaviour. As Furedi (2002) points out, we are living through insecure times and, consequently, people are more anxious and predisposed to fearing risk and acting with caution. He argues that by institutionalizing caution, the precautionary principle imposes a doctrine of limits, offering security but lowering expectations, limiting growth and preventing experimentation and change – the very basis of opportunistic behaviour.

Another intra-institutional impediment to opportunism is the UK construction industry's hierarchical, class-based structure that has resulted in a construction process that is divided along functional lines, particularly design and construction. Although these divisions have been eroded in recent times with the development of more integrated procurement systems such as design and build, partnering and construction management, they still remain strong. This is because they have been cemented into place by professional institutions that have vested interests in maintaining their distinct identities and divisions (Emmerson, 1962; Banwell, 1964; Bowley, 1966). The self-imposed isolationism of construction professions has produced an industry that is characterized by a diverse range of languages, cultures, aspirations, needs and interests. This is un-conducive to the effective communication, teamwork, and sense of trust and collective

responsibility that is needed for a positive environment that is conducive to opportunistic behaviour.

Drivers of opportunism

Although we have a reasonable understanding of the main impediments to opportunism in the construction industry, we have little knowledge of the factors that can drive opportunism. Below is a discussion of the main factors identified in mainstream management literature that influence opportunistic behaviour.

Capital

There are four forms of capital that determine an organization's ability to take advantage of opportunities: *human capital, economic capital, intellectual capital* and *social capital*. Employing more human capital in the form of more opportunistic people is the most obvious way to increase an organization's opportunistic potential. It might also be possible to use existing employees more effectively. However, identifying opportunistic people is not easy. For example, since opportunistic acts demand special creative abilities we might expect that opportunistic people have especially high IQs. While psychologists have found that low IQ people do tend to be less creative than high IQ people, the relationships is very weak (Szilagyi and Wallace, 1987; Belbin, 1997). For instance, Belbin (1997) found that groups of 'clever people' generally performed badly, being characterized by destructive debate, intolerance and a lack of coherence. Instead of depending on IQ, there seems to be a general consensus that creative acts rely on many mental processes working together in harmony: problem finding, idea generation, imagination, simplification, risk taking and motivation to learn. That is, creative people excel at finding new problems and new perspectives in their solution and at turning problems into opportunities. They are also willing to take risks, to learn from failure and are determined, unconventional, self-confident, tolerant of ambiguity and tend to be intrinsically rather than extrinsically motivated. Unfortunately, creative individuals are rare and most managers are forced to manufacture creative potential by consciously forming teams with a particular combination of roles and capabilities that induce creative tensions. Nevertheless, according to Belbin, most management teams are created in haste without proper regard to such issues and this assertion would seem to be supported by research in the construction industry (Hatush and Skitmore, 1997).

An organization's *economic capital* refers to an organization's financial resources and its ability to leverage it externally from financial markets or lending institutions such as banks. As McLindon (1996) points out, this resource base determines in large part, an organization's ability to create and take advantage of unexpected investment opportunities. However, it is not only the amount of capital that is important but also its liquidity since this determines what is freely available to use at any point in time for investment purposes.

Intellectual capital is defined as the sum of everything everybody has learnt and knows in an organization that provides a competitive edge (Stewart, 1999). This intangible form of capital represents the collective knowledge of the organization and is increasingly being considered as more important to competitiveness, than physical resources. As Stewart (1999) points out, Microsoft and Toyota did not become great companies because they were richer than IBM or General Motors respectively. They had more intellectual capital, which was something far more unique and valuable than physical or financial assets.

In contrast to other forms of capital, an organization's *social capital* resides in its networks of relationships with people in other organizations (Portes, 1998). The concept of social capital is based on the observation that well-connected people tend to do better than those who are disconnected and represents the ability of organizational stakeholders to secure opportunities and benefits by virtue of membership of other social structures. These benefits include greater information about potential opportunities, access to greater resources, power and influence, emotional support, friendship, goodwill, trust and co-operation.

Flexibility

Flexibility refers to the capacity of firms to adapt to changes in their business environment (Malecki, 1996). With an increasingly competitive, complex and turbulent business environment, the ability of an organization to adapt and change has been recognized as an increasingly important aspect of competitive advantage (Upton, 1994). Businesses are flexible to the extent that they can rapidly adapt and respond to the particular needs of a specific problem or opportunity. This demands capital-intensive investment, adequate liquidity, labour flexibility and a willingness to explore and adopt new ways of organizing production and interacting with supply chains.

Luck

According to Ma (2002), luck remains an elusive theoretical concept in the business literature, yet a fascinating practical phenomenon in business reality. Luck is the serendipitous propensity for opportunities to present themselves out of pure chance (Gunther, 1977), and Barney (1986) argues that it creates a unique endowment that can confer competitive advantage on some organizations. While luck might seem like an arbitrary concept, which

is unlikely to be used as a deliberate strategy by organizations to increase their competitive advantage, Ma (2002) found that there are tangible differences between the consistently lucky and the unlucky, that allows the concept of luck to be used rationally in business. According to Ma, whether a firm is lucky or not depends in large part on its particular position, endowments, capabilities, connections and its actions at a particular point in time. Luck appears to favour the prepared organization, which is always receptive and ready to seize and exploit unexpected opportunities.

Attitudes

An attitude is a predisposition to behave in a certain way towards objects or persons in one's environment (Steers, 1981). The negative attitudes of mitigation that persist in the construction industry have been discussed already. What has not been discussed is the product of these attitudes, which is a backward looking, risk-averse culture of hesitant, defensive behaviour. In contrast, opportunism demands an open-minded, forward-looking, risk-taking culture that is characterized by an active awareness of opportunities and a willingness to take them (Nutt and McLennan, 2000).

Locus of control

The locus of control concept was originally based on Rotter's (1954) social learning theory and refers to 'the extent to which people perceive contingency relationships between their actions and their outcomes' (MacDonald, 1973, p. 169). The underlying concept is that of empowerment – the conscious direction, selection and regulation of all knowledge structures and intellectual processes in the pursuit of personal goals, intentions and choices (McCombs, 1991; Mearns 2002). In simple terms, a person's locus of control refers to an individual's perceived mastery of their environment and how far they see themselves in control of their destiny. People who believe that they can control their own destiny are referred to as *internals* and those who believe that their experiences are determined by factors outside their control are referred to as *externals*.

The locus of control has been found to be an important predictor of opportunistic behaviour, motivation and personal effectiveness in a number of studies. For example, Rotter (1966) found that people with an internal locus of control are more likely to:

- be attentive to opportunities in the environment to improve the attainment of their goals;
- engage in actions to improve their environment;
- place a greater emphasis on striving for achievement;
- be more inclined to develop their own skills;
- ask more questions; and
- remember more information than people with an external locus of control.

In a more recent study, Maddux (1991) used the locus of control to study peoples' career decisions and found that people with an internal locus of control are far more motivated and ambitious than people with an external locus of control and that they showed significantly higher ratings in job proficiency and learning. However, Carlopio *et al.* (2001) and Durand and Shea (1974) found that individuals with an external locus of control are more inclined to be effective leaders and show more consideration to other people. Furthermore, they are more likely to comply with instructions that are at variance with their own experiences of events and be more predictable in dealing with unexpected events. However, many of these findings are complicated by issues such as gender, race and class. For example, Phares (1976) found that gender often moderates the relationship between the locus of control and behaviour. In particular, an internal locus of control is less likely to result in opportunistic behaviour in males than females because males seem to have a greater need to protect themselves against failure which results in greater external attributions.

A model of opportunity management

The proceeding discussion encapsulates the main drivers and impediments to opportunism in the construction industry. These are illustrated in Figure 1 and can be used as a basis to explore opportunistic behaviour in more detail. The apparent simplicity of the model belies its complexity, because the relative influence of each determinant is likely to vary across a multitude of risk

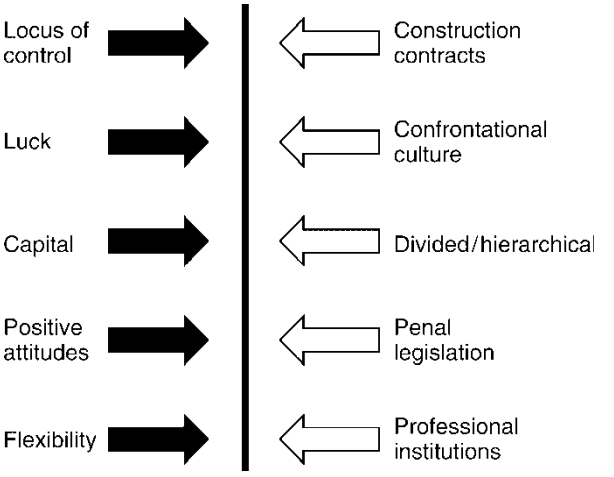

Figure 1 A model of opportunity management in the construction industry

contexts. For example, in Australia, the relatively confrontational industrial relations environment might make negative attitudes a greater impediment to opportunism in the managing industrial relations risks than in the UK (Ferguson, 1999).

It must be emphasized that the model in Figure 1 is a preliminary one that is grounded in the risk and opportunity literature, within and outside construction. Its validation will entail a considerable amount of research looking at each variable in turn, in a range of different risk contexts. Given the complexity of the model, it would not be appropriate to consider the influence of every determinant at once, in every possible risk context. For this reason, we have focussed on the locus of control in relation to health and safety risks. We chose this focus because of considerable evidence of especially poor performance in this area in relation to other industries, a negative attitude towards it and a lack of empowerment in decisions relating to health and safety in the construction industry (HSC, 1993; Dias, 1996; Lingard and Rowlinson, 1998; ABS, 2002; RCBCI, 2002). Indeed, HSC (1993) specifically identified the locus of control as one of the major dilemmas in the management of the human relations aspects of safety and recommended that further research should be conducted in this area. HSC (1993) argued that a person's ability to control the events that influence their health and safety is a fundamental right and is likely to result in more responsible and alert behaviour. A further reason for focussing on this area is that current legislation in the UK and Australia, is emphasizing the need for greater consultation in relation to health and safety decisions in the belief that greater empowerment will improve performance in this area (CDM, 1994; OHS, 2001).

Method

Data collection

An important variable in the investigation of opportunism is the timing of data collection. While a number of studies have identified the design phase as the one where the majority of risks and opportunities are created during the life of a construction project, we focused on the construction stage. This decision is based on the considerable amount of literature that indicates that the locus of control is a particular problem in relation to health and safety issues during the construction stage (see Loosemore *et al.*, 2003).

There are many instruments which have been developed to measure the locus of control, some being designed for adults, others being designed for children, some being objective, others being subjective, some being based on interviews, others being based on surveys. The basis of data collection in our research was Rotter's I-E Scale (1966), which, despite its age, is still the most widely used instrument to measure the locus of control in a range of adult occupational settings (Carlopio *et al.*, 2001). Rotter's scale is a generic 'additive' instrument that measures a 'general expectancy' of internal (I) and external (E) beliefs across a range of contexts, such as interpersonal situations, work, politics, etc. The use of Rotter's I-E scale is based on a generic survey instrument of 28 questions that is designed to assess a respondent's perceptions about their degree of control over a certain issue. Fourteen questions are presented from an 'internal' perspective and fourteen from an 'external' perspective. Internal questions are designed to test a respondent's perception that the events or issues being explored is within their control, whereas external questions seek to test perceptions that they are outside their control. The Rotter survey is deliberately adaptable to different contexts and, in this research, the focus was on peoples' perception of control over health and safety issues in the construction stage of construction projects. Responses were scaled by asking respondents to agree or disagree with a range of statements about health and safety issues on site, half of which reflected an internal disposition and, the other half reflecting an external disposition. A sample of questions from the survey are provided in Figure 2. To avoid 'response set' bias which is a particular problem in attribute measurement, questions of an external and internal disposition were randomly presented to respondents and a six point Likert scale from strongly agree to strongly disagree was used as a forced-choice response mechanism.

Sample structure

To construct a representative stratified sample of respondents, 450 surveys were randomly distributed to managers, supervisors and operatives across a range of large commercial construction projects in the Sydney metropolitan area. To ensure a statistically significant response rate in each sample strata, surveys were administered with the assistance of the National Association of Women in Construction (NAWIC), the Construction, Forestry, Mining and Energy Union (CFMEU), Bovis Lend Lease and Multiplex Construction NSW Ltd. The response rate was 55.11% (248 responses) of which 219 were suitable for statistical analysis. The detailed structure of the sample is illustrated in Tables 1 and 2.

Analysis

In analysis, each individual response was coded to establish an overall internal or external locus of control score for each respondent. In questions that reflected an internal disposition, this was done by allocating a score of 5 to strongly agree responses and a score of 0 to strongly

	Strongly **Agree**					*Strongly* **Disagree**
1. Accidents happen because companies are too easy with their employees. (Internal)	① 5	② 4	③ 3	④ 2	⑤ 1	⑥ 0
2. Most accidents are due to bad luck, it has little to do with the mistakes people make. (External)	① 0	② 1	③ 3	④ 3	⑤ 4	⑥ 5
3. One of the main reasons why we have accidents is because people do not take enough interest in their work. (Internal)	① 5	② 4	③ 3	④ 2	⑤ 1	⑥ 0
4. Acidents happen no matter how hard people work to prevent them. (External)	① 0	② 1	③ 2	④ 3	⑤ 4	⑥ 5
5. Unfortunately, an individual's worth often passes unrecognised no matter how hard he tries. (External)	① 0	② 1	③ 2	④ 3	⑤ 4	⑥ 5
6. Well-trained employees are less likely to suffer bad luck. (Internal)	① 5	② 4	③ 3	④ 2	⑤ 1	⑥ 0

Figure 2 An illustration of scale scores

Table 1 Cross tabulation of nationality vs. job title

Count		Jobtitle							Total
		Directors/ project managers	Consultants	Architects and designers	Site manager	Safety officer	Foreman	Tradesmen	
NATION	Australian	39	9	10	6	11	7	75	157
	New Zealander	1	1		1	3		18	24
	British	5	2					4	11
	South African	1							1
	Italy		1			1		5	7
	Greek	1					1	2	4
	Asian							2	2
	Brazilian							3	3
	Croatian				1			3	4
	Scottish				1	2		1	4
	Others							2	2
Total		47	13	10	9	17	8	115	219

disagree responses. The opposite was done for questions with an external disposition. This is illustrated in Figure 2. When a respondent's scores were summed for the full 28 questions, the above coding system results in a total score ranging from 0 to 140, a score of 140 reflecting a pure internal locus of control and a score of 0 reflecting a pure external locus of control. In reality, most respondents fall somewhere between these two extremes.

The data from all respondents in the entire sample were analysed using a range of descriptive and inferential statistical tests, namely; Mann-Whitney and Kruskal-Wallis. The Mann-Whitney and Kruskal-Wallis tests indicate the level of confidence that an association between variable scores can be generalized to the wider population. The Mann-Whitney test is used for two unpaired group comparisons (e.g. I-E score vs. gender)

Table 2 Cross tabulation of job title vs. gender

Jobtitle	Gender		Total
	Femate	Male	
Directors/project managers	22	25	47
Consultants	7	6	13
Architects and designers	9	1	10
Site manager		9	9
Safety officer	1	16	17
Foreman		8	8
Tradesmen		115	115
Total	39	180	219

and the Kruskal-Wallis test is used where there are three or more unpaired groups being compared (e.g. I-E scores vs. job title and I-E scores vs. Nationality) (Argyrous, 1996; De Vaus, 2001). Both tests produce a p value that when < 0.05 indicates a 95% confidence level, meaning that the results can be generalized.

Discussion of results

Gender

Table 3 illustrates the average locus of control for the entire sample and for the male and female respondents within it. Both scores indicate an internal locus of control that suggests that people feel a relatively high degree of control over health and safety issues. This could be the result of recent legislation in Australia, which has had a heavy emphasis on consultation in safety decisions. However, it is important to note the higher score for women than for men, the significance value of 0.0315 (0.063/2) indicating that these differences are statistically significant. This indicates a higher perception of empowerment among women than men and is surprising given the lower level of seniority of females in the sample (see Table 2), something that is reflected in the wider population of the construction industry (Dainty *et al.*, 2000). However, perhaps this result is a reflection of the relatively high involvement in design for our female respondents (see Table 2), which is where the majority of significant decisions governing a project are made.

Table 3 Mann-Whitney test for I-E scores vs. gender

Ranks			
Gender	*n*	Mean rank	Sum of ranks
Score			
Female	39	127.10	4957.00
Male	180	106.29	19 133.00
Total	219		
Test statlstics[a]			
		Score	
Mann-Whitney U		2843.000	
Wilcoson W		19 133.000	
Z		–1.860	
Asymp.Sig. (2-tailed)		0.63	

[a]Grouping variable: Gender

Nationality

Table 4 illustrates the results of a Kruskal-Wallis Test for I-E score vs. nationality. It indicates considerable variation between the scores of each nationality in the sample, although it is important to note the high variability of relative representation in the overall sample. Clearly, further research is needed because of the relatively low representation of some groups in the sample. Nevertheless, the results do make interesting reading. For example, it is evident that Asians have a relatively low perception of control compared to all groups apart from Croatians. This is worrying given the vulnerability of Asian workers to discrimination in Australia (Unity, 1999) and the fact that Asians now represent 43% of all new migrants settling in Australia and an increasing proportion of the construction workforce at operative level (ABS, 1999). However, it is not surprising given the self perceived levels of discrimination suffered by this group in the Australian construction industry (Loosemore and Chau, 2002). Another interesting finding is that Australians, British, Greeks and South Africans have a relatively high locus of control. This is likely to be related to the relatively senior managerial positions they tend to hold in the Australian construction industry, which is likely to give

Table 4 Kruskal-Wallis Test for I-E score vs. nationality

Ranks		
Nationality	*n*	Mean
Australian	157	116.6
New Zealander	28	88.94
British	11	128.6
South African	1	218.5
Italian	7	80.36
Greek	4	110.7
Asian	2	55.50
Brazilian	3	73.83
Croatian	4	48.63
Others	2	103.7
Total	219	
Test statlstics[a,b]		
	Score	
Chi-Square	17.785	
df	10	
Asymp. Sig.	0.59	

[a]Kruskal Wallis Text; [b]Grouping vanable: nation

them a greater say in health and safety decisions. In Australia, there is a strong relationship between nationality and occupation and this is likely to have had an important impact on our results. For example, Croatians tend to concentrate among the carpentry and form working trades, Italians among the concreting trades, Koreans among the tiling trades and Maori New Zealanders among manual trades such as scaffolding.

Occupation

Table 5 illustrates the results of a Kruskal-Wallis test for I-E score vs. job title and indicates considerable variation in the locus of control of different job titles. In particular, it is noticeable that higher levels generally report a higher perception of control than lower levels. This is to be expected but not welcomed since those in tradesmen positions often hold valuable information to the minimization of safety risks and should also be involved in health and safety decisions for motivational reasons. It is also particularly worrying that those who classified themselves as Safety Officers felt the third lowest level of control and that architects and designers reported the second lowest level of control. The low score for safety officers may reflect the unionization of this position. In Australia, safety officers are union representatives that are likely to have a suspicious attitude towards those with decision-making authority by virtue of the confrontational relationships between the unions and employers in the Australian Construction Industry and the poor record of the industry in this area. Conversely, this poor relationship is mutual and may result in token involvement of safety officers in decision-making by managers rather than meaningful involvement. Clearly, this merits further investigation. However, the low score for architects and designers raises the concern that these people are not aware of the extent to which their activities influence safety risks. Given their central position within the project team, there should be no organizational impediment that limits their power to influence such decisions. The low I-E score for this group also questions the conclusion drawn in relation to Table 3 – that one of the reasons for the high female I-E score was their relatively high involvement in design roles. Given the results in Table 5, this seems unlikely and leaves no obvious explanation of why females report significantly higher scores than males.

Table 5 Kruskal-Wallis test for I-E score vs. job title

Ranks		
Jobtitle	*n*	Mean rank
Score		
Directors/project managers	47	144.70
Consultants	13	138.96
Architects and designers	10	96.60
Site manager	9	144.17
Safety officer	17	107.76
Foreman	8	111.69
Tradesmen	115	91.25
Total	219	

Test statlstics[a,b]	
	Score
Chi-Square	29.995
df	6
Asymp. Sig.	0.000

[a]Kruskal Wallis Text; [b]Grouping vanable: Jobtitle

Conclusion

The aim of this paper was to explore the determinants of opportunism in the construction industry, to propose a model that reflected this and to investigate the locus of control as one key component of this model. This was done in relation to health and safety issues that represent one of the high risk and low performance areas for the construction industry. Using Rotter's I-E survey across a sample of 219 respondents, it is evident that the overall average locus of control is relatively high. While this is encouraging, some groups have emerged as particularly dis-empowered. These include architects and designers, union safety representatives, tradesmen and Asian operatives. The empowered are senior managers, British, Australians, South Africans and females. This is a discrepancy that needs to be addressed if the industry is to improve its performance in this area. While the results only reflect peoples' perceptions of empowerment and need to be interpreted in the context of the limited sample size in some sample strata, the empowered have a special responsibility to involve the dis-empowered in improving the performance of the construction industry in health and safety issues.

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