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**THE IMAGE OF THE CONSTRUCTION INDUSTRY: A CROSS  
SECTIONAL ANALYSIS**

by

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# THE IMAGE OF THE CONSTRUCTION INDUSTRY: A CROSS SECTIONAL ANALYSIS

## Abstract

A postal survey is described aimed at identifying the major factors associated with the image of the both the UK and Hungarian construction industries in terms of the differences in attitudes between the ages, gender, education, occupation, and various measures of construction industry experience of the respondents. The survey, conducted simultaneously in both countries in early 1988, produced a total of 409 and 456 complete responses in the UK and Hungary respectively on a wide range of topics covering both the products and processes of the industries concerned.

Using a multivariate technique, it was possible to separate the effects of each dependent variable on the independent variables. These were reduced routinely to a group of significant effects which were then considered for the purposes of hypothesis generation.

The major findings of the work indicate a dominating influence of direct personal experience, rather than reported evidence, on attitude formation. Respondents with the most industry experience were found to have a lesser regard for the influence of authority generally, and management in particular, on industry performance, than others.

Keywords: Image, Attitudes, Perceptions, Log linear analysis.

## Introduction

The image of the construction industry has often been said to be a major factor in determining its position in relation to other industries in terms of status and general contribution to society (March, 1975). The general view from within the industry seems to be that this image is unnecessarily poor, even on an international scale (Gacsalyi *et al*, 1990).

The Building Employers Confederation (BEC) and Chartered Institute of Building (CIOB) have for some time been concerned over the poor image of the industry and its ramifications on the future. The report on "Advanced Courses in Building Sector Higher Education" published by the National Advisory Body for Public Sector Higher Education (NAB) together with Sir James Lighthill's "Degrees in Building Management; Demand, Provision and Promotion" both identify the image issue to be the major factor in restricting the supply of 'quality' personnel into the industry.

It has been suggested that the industry suffers from rather biased treatment in the popular press and television coverage (March, 1975). Whether this is really the case is ultimately an empirical matter and recognised techniques such as content analysis are available as a suitable means of analysis. Before this can be carried out however some prior research is needed to define more clearly what is meant by 'bias' in this context, how it may be measured, and to locate possible causal factors for further detailed study.

Some work has already been done by the Construction Industry Training Board (1979) in examining the attractiveness of the industry to young people seeking careers as technicians or technologists. In this study Building, in comparison with Accountancy, Computer Programming, Aircraft and Electronics, was found to be rated lower in job factors considered to be important by the respondents. The

formation of these opinions were found to be derived from careers literature, books and adult contacts in preference to social and educational sources. The accuracy of the information derived from these sources was however not investigated in this study although it was noted that "... boys whose fathers had work experience in the Building Industry ... have few illusions about Building". In these cases the important job factors were rated higher than those with no family connections in the Industry. The author's own experience in recruitment and motivation of building students tends to confirm this observation, and suggests that third party reports of the industry in some way conflicts with the reality experienced by the construction personnel themselves.

Informal contacts with people both in and outside the industry suggests that personal experience may also be a major influence in attitude formation. Building, unlike many other topics of study, is an all pervading aspect of the environment. Everybody 'knows' something about buildings, and a considerable folklore exists on the subject. The intention of the research was to examine, analyse and quantify the major characteristics of this folklore.

The first part of the study has already been reported by Gacsalyi *et al* (1990) in the form of a cross cultural comparison between the United Kingdom and Hungary in which the major perceived image ratings of the two countries were defined in terms of the industry's products and processes. The work described in this paper concerns the cross sectional structure of image attitudes in the two countries by considering the effects of knowledge of the industry in terms of occupation, relations, ownership, interest and capabilities, together with other relevant factors such as age, education and gender.

## Methodology

The rather scant and anecdotal nature of prior knowledge of the subject area, together with the absence of any established methodology directly relevant to the work, suggested the need for a broad survey to identify the salient characteristics of nature of the problem as a precursor to further depth studies. This suggested a suitable approach to be by postal questionnaire covering a wide range of likely distinguishing issues. The necessary inclusion of lay persons and the lack of interviewer guidance meant that the questions posed had to be simple, straightforward, and generally in lay terms with the provision of answer boxes for ease and speed of response.

The breadth of the subject matter resulted in a relatively lengthy questionnaire of which a total of 78 responses were required. Pilot studies indicated however that the simple nature of the questions, together with the need to give quick, subjective responses, enabled a full response to be made generally in less than 15 minutes.

The method of analysis was dominated by two major considerations (1) to reduce the number of variables to a small but significant level for to enable a comprehensible set of results to be obtained, and (2) to minimise any bias due to the researchers' personal prejudices on the subject. This was achieved by the development of a routine statistical analysis aimed at variable parsimony and as described below. The only point at which the researchers' experience was needed was in the interpretation of the results, which are presented here in total prior to interpretation. Naturally it is expected that readers will wish to apply their own interpretations.

### Data

Data were collected by means of a postal questionnaire administered to a total of over 1000 recipients in each country representing a reasonable cross section of the industry's employees and lay public. An early pilot study was conducted to test the questionnaire's ability to generate data relating to the strength and source of opinion

on such matters as construction quality (in terms of appearance, function, reliability, comfort, cost, etc.) and process (in terms of efficiency, competency, safety, glamour, desirability as a career, etc.). The final version of the questionnaire was issued, mainly by post, simultaneously in both countries in early 1988. A similar number of responses were received (456 Hungarian and 409 British) with only minor differences in composition.

### Variables

The intention was to identify empirically the major relevant variables associated with the industry's image, in terms of **dependent variables** such as respondents' age, gender, education, residence, occupation, and knowledge, experience and interest in the industry, and in terms of **independent variables** such as the quality, quantity, duration and price of different building types, technology, productivity, discipline, wages, environmental care, factors influencing performance, reliability of contractors, creativity in employment, and work preferences.

Table 1: Questionnaire structure

Level	Product	Process
Inter Industry	1. National contribution	-
Intra Industry	2. Performance characteristics 3. Quality causes 4. Quality changes 5. Quantity 6. Price levels	11. Organisation 12. Management 13. Speed and deadlines 14. Technology

	7. Price causes	
Inter Projects	8. Quality	-
Inter Organisation	9. Reliability 10. Prices	15. Influence on performance 16. Creativity 17. Employment preference
Site	-	18. Productivity, discipline and working conditions 19. Wages 20. Pollution and disturbance

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10 dependent variables were identified in the questionnaire - age (AGE), gender (SEX), education (EDUC), occupation (FOGL), residence (RESIDEN), work in construction industry (WORKIN), relatives in construction industry (RELIN), interest in buildings (ATTEN), Do It Yourself experience (DIY), and property ownership (OWNP). Of these, the OWNP variable did not appear in the Hungarian version of the questionnaire.

78 independent variables were examined. These consisted of two major groups (1) attitudes/beliefs about the construction industry, and (2) attitudes/beliefs about the reporting of the construction industry. The first of these contained twenty subgroups as shown in Table 1 concerning the industry's products and processes from inter industry to site level. Each of these contained the following variables:

#### 1. National Contribution

Importance of building industry to the Economy (IMPCON)

#### 2. Performance characteristics

Ease of use (EASE)

Comfort (COM)

Quality (QUAL)

Appearance (APP)  
 State of repair (STATE)  
 Harmony with environment (HARM)

### 3. Causes of poor quality causes

Bad design (P1)  
 Poor craftsmanship (P2)  
 Poor organisation (P3)  
 Poor education of construction people (P4)  
 Lack of motivation of construction people (P5)  
 Lack of regulation/legal enforcement (P6)  
 Poor site supervision (P7)

### 4. Quality changes

Maintenance and renewal (REC)  
 Degree of improvement (CH)

### 5. Quantity

Volume of maintenance and renewal work (MAINT)

### 6. Price levels

Cheapness of building prices (NOW)

### 7. Price causes

Materials and components (PR1)  
 Labour costs (PR2)  
 Plant costs (PR3)  
 General overheads (PR4)  
 Transport costs (PR5)  
 Management and organisation (PR6)  
 Inter firm relations (PR7)

### 8. Quality of buildings

Entertainment (QE)  
 Industrial and commercial (QI)  
 Public (QP)  
 Residential (QR)

### 9. Reliability of contractors

Big firms (REL1)  
 Medium size firms (REL2)  
 Small firms (REL3)  
 Private craftsmen (REL4)

Some of these (REL5)

## 10. Prices

Differences between firms (PDIF)

Big firms charge most (CSIZ1)

Medium size firms charge most (CSIZ2)

Small size firms charge most (CSIZ3)

Private craftsmen charge most (PRICES)

## 11. Organisation

Goodness of organisation of building work (BORG)

## 12. Goodness of management

Design firms (DMAN)

Contracting firms (CMAN)

## 13. Speed and deadlines

Speed of new work (NEWQ)

Speed of rehabilitation work (REHQ)

Length of deadlines (DEAD)

Speed of defects repairs (DEF)

## 14. Technology

Uptodateness of technologies and equipment (MODN)

## 15. Influence on performance

Designers (POS1)

Contractors (POS2)

Subcontractors (POS3)

Materials/components manufacturers (POS4)

Local Authorities (councils) (POS5)

Central Government (POS6)

Quality control (building inspectors) (POS7)

## 16. Creativity needed by architect/engineer working in

Design bureau (CR1)

Contractors' office (CR2)

Building site (CR3)

Developer organisation (CR4)

Building research organisation (CR5)

Educational institution (CR6)

LA building department (CR7)

Government office (CR8)

## 17. Employment preferences

Size of construction firm (WORKP)  
 High wages (PRE1)  
 Good working conditions (PRE2)  
 Interesting work (PRE3)  
 Good quality management (PRE4)  
 Prestige of job (PRE5)  
 Nice atmosphere (PRE6)  
 Social welfare (PRE7)  
 Low intensity of work (PRE8)

## 18. Level of productivity, discipline and working conditions

Productivity (PRODUCT)  
 Discipline (DISCP)  
 Working conditions (WCOND)

## 19. Wages

Level of pay (WAGES)

## 20. Pollution and disturbance

Care taken to avoid pollution (POLLUT)  
 Care taken to avoid disturbing people with noise etc (DISTUR)

The group (2) variables comprised two questions - the favourableness of media reporting of construction (MEDFAV), and the accuracy of media reporting of construction (MEDACC).

One of the independent variables PRICES was omitted from the UK questionnaire.

## Analysis

A log linear form of analysis was used to partial out the effects of the other dependent variables in preference to the more usual regression approach as most of the variables resulting from the questionnaire were measured on ordinal/categorical type scales. A

lengthy series of bivariate chi-square tests had to be made in advance however in order to reduce the number of independent variables to a manageable size. These were carried out on each dependent variables against each independent variable scored in the questionnaire, a total of over 1500 separate analyses in all. The joint distribution of the pairs of variables was examined under the null hypothesis that the cell proportions were the same. Where the expected cell value was less than 5 the raw data were collapsed into an adjacent category. The chi-square statistic was computed for each analysis and values with a probability of less than 0.05 recorded. For variables containing more than two categories, these were then examined for trends and only the variables where such appeared to be present were retained.

A multivariate log linear analysis was conducted for each independent variable against the resulting subset of dependent variables, a total of 78 analyses. In order to reduce computational and interpretive problems, it was assumed that the dependent variables were statistically independent, ie. no interaction effects were considered. The Z values of the resulting parameter estimates were then examined and variables with Z values greater than 1.96 recorded.

In order to gain an impression of any underlying structure, and to help in interpretation of results, these independent variables were then subjected to a factor analysis for each dependent variable. The orthogonalised factors identified were then used to aid in the interpretation of results.

## Results

### (1) Age

The original responses were grouped into six age categories: up to 15, 15 to 20, 20 to 30, 30 to 40, 40 to 50, and over 50 years old. Shortage of data in some of the groups led to eventual reclassification of the first three groups into an 'under 30' group. The resulting factors and loadings are summarised in Table 2.

Table 2: AGE factors and loadings

	UK		Hungary		
	1	2	3	1	2
POS3 (0.85)		PRE2 (0.71)	CR6 (0.68)	WCOND (0.66)	PRE1 (0.66)
POS2 (0.80)		WCOND (0.48)	PRE5 (0.60)	CSIZ1 (0.58)	COM (0.64)
POS6 (0.39)		CMAN (0.44)	REL2 (0.54)		
		POS1 (0.38)	POS4 (0.37)		

### *UK*

Factor 1 indicates that younger people are more likely than older people to think that central government (POS6), rather than contractors (POS2) or subcontractors (POS3), are in a position to improve building industry performance. Factor 2 indicates that younger people are more inclined to prefer good working conditions in their job (PRE2) and that such conditions prevail on site (WCOND). Factor 3 indicates that younger people have a higher regard for the creativity of designers, especially in education (CR6) and their capacity to improve construction industry performance

(CMAN). Related to this is the desire for younger people to work on high prestige jobs (POS1) and the feeling that big contracting firms are poorly managed (CMAN).

The responses are predominantly at the inter organisation/site level and are solely concerned with the industry's processes implying a preoccupation with **how** buildings are produced rather than **what** is produced. The general impression is that younger people tend to have a higher regard for design and those perceived to be in authority in the construction industry. This excludes all types of construction companies and especially the larger ones who are considered to be poorly managed despite good and attractive working conditions on site.

### *Hungary*

Factor 1 indicates that younger people are more likely than older people to think that site working conditions are good (WCOND) and that large construction firms charge the lowest prices (CSIZ1) perhaps due to their perceived better reliability than smaller firms (REL2) whilst materials/component manufacturers have relatively little influence.

### (2) Gender

### *UK*

The factors and loadings are summarised in Table 3a.

Table 3a: SEX factors and loadings

1	2	3
CR7 (0.68)	CSIZ1 (0.77)	REL4 (0.70)
POS5 (0.68)	CSIZ2 (0.74)	P2 (0.58)

POS7 (0.62)  
 CR2 (0.62)  
 POS4 (0.50)

DEAD (0.55)

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Factor 1 indicates that females are more likely than males to think that creativity is needed by architects/engineers in local authorities (CR7) and contractors' offices (CR2), and that local authorities (POS5), building inspectors (POS7), and materials/component manufacturers (POS4) are in a position to improve building industry performance. Factor 2 indicates that females think that large contractors (CSIZ1) charge the highest and medium sized contractors (CSIZ2) charge the lowest prices. Factor 3 indicates that females think that private craftsmen are the most reliable (REL4), poor quality building is due to poor craftsmanship (P2) and contractors work to long deadlines (DEAD).

Here the gender differences are split evenly between process and product, with the emphasis mainly at the inter organisation level. The main points of difference concern the influence of authority and manufacturers on performance, the level of creativity at work, a preference for smaller contractors in terms of price, reliability and careful craftsmanship.

A similar analysis of the same data based on five factors (Gale and Skitmore, 1990) concluded that four main characteristics distinguishing female from male attitudes - preference for smallness, the influence of authority, the prevalence of creativity, and the importance of component manufacturers. They also considered the two factor case which revealed two clusters of variables, one consisting of a preference for small firms both in terms of price and reliability with related long deadlines, and one consisting of both the creativity and influencing variables, a common feature of which was thought to be the role of authority. The general conclusion in this case was that the females in the study seemed to be of the view that construction is something of a

cottage industry, consisting of good small companies relying on their component suppliers and held together by an authoritarian rule.

### *Hungary*

Table 3b: SEX factors and loadings

1	2	3	4	5	6
COM (0.86)	POS5 (0.75)	CR3 (0.72)	PR3 (0.60)	NOW (0.69)	PRE5 (0.73)
EASE (0.83)	POS6 (0.66)	CR4 (0.71)	QI (0.59)	DEAD (0.63)	P4 (0.68)
		POS1(0.55)	PRE2(0.44)	MEDACC (0.36)	

Factor 1 indicates that the females are more likely than males to think that comfort (COM) and ease of use (EASE) of buildings is unsatisfactory. Factor 2 indicates the female perceived influence of local authorities (POS5), central government (POS6) and designers (POS1) on building industry performance. Factor 3 indicates the higher rated creativity by architects/engineers on building sites (CR3) and in development organisations (CR4). Factor 4 indicates a concern for industrialisation both in terms of plant costs (PR3) and buildings (QI), which is related to a preference for good working conditions in employment (PRE2). Factor 5 indicates an awareness that buildings are more expensive nowadays (NOW) which is related to contractors working to shorter deadlines (DEAD) and a greater belief in the accuracy of media reporting (MEDACC). Factor 6 indicates a lack of female preference for prestige in their work (PRE5) and a related belief that poor quality building is due to poor education of construction people (P4).

These response differences are mainly centred at the intra industry level for products and inter organisation level for processes. Some of the gender effects found in the UK

sample - the females' greater regard for authority, and belief in the existence of creative opportunities - are also present in these data. In general however the Hungarian women seem to exhibit many more gender differences than their UK counterparts. The greater dissatisfaction with comfort and ease of use offers some evidence an intolerance of living and working conditions, probably in the home, and possibly a reflection on a desire for greater sophistication by women in Hungarian society. Factors 4 and 5 seem to be related to this in terms of the awaited benefits of mechanisation to reduce costs, speed up the construction process and provide better working conditions. Factor 6 however suggests this sophistication not to extend to prestige (or, presumably, status), but that a major factor is in the level of education of the people involved. In comparison with the women in our UK sample who see considerable benefits in individual craftsmanship in terms of both quality and price, it would seem that the women in Hungary would prefer to see a greater degree of automation to achieve the same end.

### (3) Education

To enable a reasonably direct correspondence between the educational systems of the two countries, three groups were employed: secondary/sixth form, college of FE/HE, and polytechnic/university.

#### *UK*

Only two variables emerged to distinguish between the different levels of formal education of those in the sample of respondents in the UK. These were both concerned with the quality of buildings. The people with higher formal education are more likely than others to think that the quality of residential buildings is unsatisfactory (QR). Likewise, these same group thought that poor quality buildings

were due to 'other factors' than those covered in the questionnaire (P8). Although this second result may be more a reflection of the way this group of people respond to questionnaires in general, irrespective of the topic, the dissatisfaction with residential buildings is hard to interpret in the absence of any other information.

Perhaps the most interesting feature of this result is the lack of any other distinguishing variable such as poor education of construction personnel (P4) updateness of technologies (MODN) and accuracy of media reporting (MEDACC), any of which would have accorded well with the prejudices of the researchers. Also, as it is a fact that people with a higher formal education are also in receipt of greater incomes, it is surprising not to find differences in attitudes to construction prices and employment preferences.

### *Hungary*

Table 4: EDUCATION factors and loadings

1	2	3	4	5	6
PRICES (0.87)	CMAN (0.75)	PRE6(0.77)	CR8 (0.74)	P4 (0.74)	POS4 (0.71)
CSIZ1 (0.87)	PRODCT(0.67)	QUAL(0.57)	REL4 (0.72)		QE (0.61)
	STATE (0.45)	MAINT(0.43)			QP (0.43)

Factor 1 indicates that higher formally educated people are more likely than lesser formally educated people to think that big construction charge the highest (CSIZ1) and private craftsmen charge the lowest prices (PRICES). Factor 2 indicates that these people think that big construction companies are badly managed (CMAN) and perhaps consequentially that productivity is low (PRODCT) together with the related belief that the state of building repair is unsatisfactory (STATE). Factor 3 indicates a preference for a nice working atmosphere (PRE6) but that the quality of buildings is

unsatisfactory (QUAL) with less maintenance and renewal work done in recent years (MAINT). Factor 4 indicates the belief that architects/engineers in government offices are less creative (CR8) and that private craftsmen are less reliable (REL4). Factor 5 indicates the belief that poor quality is due to poor education of the construction personnel involved. Factor 6 indicates that materials/components manufacturers are in a position to improve building industry performance (POS4) and that entertainment (QE) and public buildings are unsatisfactory (QP).

These results show a fair spread across both industry levels and product/process distinctions. A common factor for the higher formally educated in Hungary is clearly the discontentment with the industry's products and processes generally, due to the quality of manufactured components, the management of larger construction firms, and reliability of craftsmen, possibly as a result of poor education of those involved (excluding designers and those responsible for state control). This also seems to be seen as resulting in unnecessarily poor productivity and high prices especially by larger contractors.

#### (4) Occupation

From an original list of 49 different occupations, these were ultimately grouped into either managerial or clerical.

#### *UK*

Four variables emerged as distinguishing characteristics between the beliefs of managerial and clerical staff. These were considered to be too disparate for a meaningful factor analysis. The results indicated the managerial staff were more likely than clerical staff to think that the quality of industrial buildings is satisfactory

(QI), building work is less expensive now (NOW), medium size construction firms are more reliable (REL2), and care is taken to avoid pollution (POLLUT).

The major observation of this result is that managerial staff seem to have a more favourable impression of the construction industry than their clerical counterparts possibly due to their lower degree of exposure to the immediate problems of the industry.

### *Hungary*

Only one variable distinguished the two groups of respondents - that managerial staff were more likely than clerical staff to think that the quality of recent maintenance and renewal work is poorer.

### (5) Residency

For the UK analysis, the postcodes of the respondents were recoded into five groups denoting the size of the towns involved: villages, small towns, large towns, conurbations, and major centres (eg. London). The Hungarian responses were structured into two groups: those residing in Budapest, and those residing outside Budapest.

### *UK*

Four distinguishing variables were found, all loading on the same factor. These indicated that the people in the larger centres thought that new work was carried out more slowly (NEWQ), they have a greater preference for higher wages (PRE1) but

less preference for working in small firms (WORKP) whilst people who live in towns prefer to work in medium size firms (WORKP).

The clear impression is that people living in larger conurbations are more attuned to city life - higher pay, bigger companies, and perhaps an impatience with the speed of building work caused by expectations induced by a greater pace of life generally.

### *Hungary*

The results of the factor analysis of the 15 distinguishing variables in the Hungary analysis are summarised in Table 5.

Table 5: RESIDENCY factors and loadings

1	2	3	4-	5
CMAN (0.68)	WAGES (0.68)	REL4 (0.75)	PRE6 (0.67)	P4 (0.71)
DISTUR (0.63)	P7 (0.60)	CR8 (0.73)	PR2 (0.59)	QR (0.40)
DEF (0.57)	QUAL (0.52)	MAINT (0.35)		
DISCP (0.52)				
P3 (0.40)				

Factor 1 indicates that people residing in Budapest (Bps) are more likely than other people (nBps) to think that large construction companies are managed well (CMAN), little care is taken to avoid disturbing people (DISTUR), defects repairs take a long time (DEF), poor quality is due to poor organisation (P3), and people in big towns outside Budapest tend to think that site discipline is relatively poor (DISCP). Factor 2 indicates that people in big towns think that construction wages are high (WAGES), poor quality is due to poor site supervision (P7), and Bps are more dissatisfied with the general quality of buildings (QUAL). Factor 3 indicates that people in big towns think that private craftsmen are less reliable (REL4), architects/engineers in

Government offices are less creative (CR8), and Bps think that less maintenance and rehabilitation work has been done recently (MAINT). Factor 4 indicates that Bps have less preference for a nice atmosphere in their working environment (PRE6), and that the price of buildings is less affected by the labour costs involved (PR2). Factor 5 indicates that Bps are more likely to think that poor quality is due to the poor education of the construction people involved (P4), and are generally dissatisfied with quantity of residential buildings under construction (QR).

In terms of the five factors, our interpretation of these results is that Factor 1 suggests that, although Bps believe large construction companies are relatively well managed, they are not managed well enough to avoid problems of disturbance, speed of work and site discipline. Factor 2 suggests that the quality of buildings generally in cities is thought to be poorer than elsewhere and that this is attributable to poor site supervision, rather than inadequate financial incentives for the workforce. Factor 3 suggests that the amount of maintenance and refurbishment work is inadequate in the cities, possibly because of the unreliability of craftsmen and the inadequacies of Government designers. Factor 4 seems to indicate the city dwellers' desire for monetary gain in preference to, but not to the detriment of, social needs. Factor 5 coincides to some extent with the 'educated' concern for the lack of construction education and need for better housing facilities.

These results are equally divided between process/product and industry levels, showing a generally increased dissatisfaction associated with people residing in Budapest and other large towns, in terms of care, site discipline, general quality, the quantity of housing, maintenance, and refurbishment. A particularly interesting feature of these results is the rather ambivalent attitude to management and organisation, where Bps have a higher regard for the management of large construction companies in terms of reliability, but that poor supervision, site discipline, and education of those involved are important problems. Another point of

interest is the belief of city dwellers that wages are relatively higher in the industry, but that this has little effect on building prices.

#### (6) Construction industry workers

This variable contains two groups - those that are working or have worked in the construction industry at some time, and those that have not.

*UK*

Table 6a: WORKIN factors and loadings

1	2	3
PRODC (0.63)	POS7 (0.88)	IMPCON (0.93)
CR4 (0.61)		
P5 (0.60)		

Table 6a gives the results of the factor analysis of the five independent variables involved.

Factor 1 indicates that people with work experience in the construction industry are more likely than others to think that site productivity is low (PRODC), architects/engineers in developer organisations are creative (CR4), and poor quality buildings are due to the lack of motivation of the construction people involved (P5). Factor 2 indicates a greater reluctance for these people to accept that building inspectors are in a position to improve industry performance (POS7), and Factor 3 indicates a greater belief that the construction industry is important in the national economy (IMPCON).

Apart from IMPCON, all these variables are essentially concerned with the construction *process* at the inter organisation or site level. Factors 1 and 2 seem to suggest that the differences between the two groups concern the recognition of role of individual motivation of construction industry personnel, which is seen to affect productivity and quality. State intervention, in the form of site inspection is not seen by experienced construction people to be of consequence. The difference in views on the status of the industry is interesting, tending to show that construction workers have a higher regard for the industry than outsiders.

Perhaps more important is the possible differences that have not been found to exist, in terms of the organisation of the process generally, prices, deadlines, working conditions, technological state, discipline, wages, care of the environment, size of construction companies, management of the design, and the state of media reporting - all of which were anticipated from our own preconceptions.

### *Hungary*

Table 6b gives the results of the factor analysis of the 14 independent variables involved.

Table 6b: WORKIN factors and loadings

1	2	3	4	5	6
DISCP (0.84)	CSIZ1 (0.85)	REL3 (0.70)	P6 (0.75)	HARM (0.59)	P8 (0.82)
BORG (0.81)	CSIZ3 (0.82)	REL1 (0.67)	POS7 (0.65)	WAGES (0.58)	NOW (0.56)
		DEF (0.41)		REL4 (0.51)	

Factor 1 indicates that people with work experience in the construction industry are more likely than others to think that building work is well organised (BORG) and site

discipline is good (DISCP). Factor 2 indicates a belief that large construction companies charge the highest price (CSIZ1) and private craftsmen charge the lowest price (CSIZ3). Factor 3 indicates a belief that large and small construction companies are more (REL1) and less reliable (REL3) respectively, and that repairs are done quickly (DEF). Factor 4 indicates a lack of belief that poor quality is due to regulation/legal enforcement (P6) and that building inspectors are in a position to improve industry performance (POS7). Factor 5 indicates a belief that buildings are generally in harmony with the environment (HARM), wages are not high (WAGES), and that private craftsmen are less reliable (REL4). Factor 6 indicates a belief that poor quality is due to 'others' (P8) and that buildings are not more expensive nowadays (NOW).

These differences occur equally between industry levels and product/processes. The overall impression is that people with construction industry experience are happier with the industry on several counts - organisation and discipline, speed of repairs, the price of construction work, and the environmental harmony of buildings. Like their UK counterparts, they are reluctant to accept that government controls can significantly affect building quality and general performance in the industry and tend to believe that a variety of 'other' people are responsible for poor quality. A further distinction seems to be in the recognition of increased reliability of large construction companies over both small companies and individual craftsmen, although the large companies tend to charge more. Again, working conditions, technological state, care of the environment, the management of the design process, and the state of media reporting were not found to be significant distinguishing factors.

## (7) Relatives in the construction industry

*UK*

Four variables emerged as distinguishing characteristics between the beliefs of respondents with and without close relatives with construction industry work experience. These comprised two factors. The first factor indicates that people with relatives in the industry are more likely than others to think that the appearance (APP) and quality of buildings (QUAL) is satisfactory. The second factor indicates that these people believe that architects/engineers working in building research organisations are less creative (CR5) and that media reporting of the industry is generally less favourable (MEDFAV). The general nature of these results suggest that the people with relatives in the industry are generally supportive of the industry' products, perhaps contrary to media reports, but with little substantive justification.

### *Hungary*

The analysis of the Hungarian data produced three distinguishing variables, indicating that the respondents with relatives in the industry believe that both design (DMAN) and construction firms (CMAN) are well managed, and that media reporting is rather inaccurate (MEDACC). This is clearly a reflection on the construction *process* rather than the product and, like the UK result, seems to reflect a supportive rather than substantive attitude, and perhaps contrary to media reports.

### (8) Interest in buildings

The actual question put to the respondents was "When walking down the street how much attention do you pay to buildings?", admissible answers being 'very much', 'moderately', 'not very much', and 'not at all'. The lack of a suitable number of

responses of 'not at all' resulted in this being combined with the 'not very much' answers.

### *UK*

Four variables emerged as distinguishing characteristics between the beliefs of respondents classified on this measure. These comprised two factors. The first factor indicates that those paying most attention to buildings believe that building work is well organised (BORG) and defects are corrected quickly (DEF). The second factor indicates that these people believe that designers are in a position to improve construction industry performance (POS1) and that architects/engineers in contractors' offices are more creative (CR2). This suggests that people who pay attention to buildings tend to have a better regard for construction activity at site level, with a major influence being exerted by designers *in construction companies*. The accent would seem to be on the creative aspects of the construction *process* which they see as a dominating effect on the industry's general level of performance.

### *Hungary*

The analysis of the Hungarian data provided five distinguishing variables loading on three factors. The first factor indicates that those paying the most attention to buildings believe that architects/engineers in design bureaux (CR1) and in building research organisations (CR5) are more creative, and that contractors are more in a position to improve industry performance (POS2). The second factor indicates that poor quality is regarded as being due to the poor education of the construction people involved (P4), and the third factor indicates that they think that comfort levels in buildings are more satisfactory (COM).

This seems to suggest a more remote view of the industry than the UK respondents in that the creative aspects are more directly related to the products of the industry, performance being thought of more in terms of process factors influenced by the education level of construction personnel. Here there appears to be a greater distinction between design and construction than is found in similar respondents in the UK.

#### (9) DIY experience

The analyses on this variable are not quite comparable between the two countries. DIY in the UK is generally thought to be more as a hobby rather than as a professional activity. In Hungary, DIY is usually undertaken by worker cooperatives and therefore more akin to 'real' construction industry experience.

#### *UK*

Only two variables emerged as distinguishing characteristics between the beliefs of respondents classified on this measure. These indicated that people with DIY experience are less likely than others to believe that poor quality is due to lack of regulation/legal enforcement (P6) and in the accuracy of media reporting (MEDACC). Clearly it would seem that their own efforts reveal some insights into what they view as popular misconceptions of the role of the legal system in quality control and the veracity of media reports.

#### *Hungary*

Two variables also emerged from the Hungary data. These indicated that people with DIY experience were less likely to believe that local authorities are in a position to improve industry performance (POS5) but more likely to think that media reports are favourable (MEDFAV). Although the lack of regard for the influence of authority is to be expected as a common theme among people with construction industry experience, the belief in the favourableness of media reports is difficult to explain in the absence of any other material. One possibility is that, as DIY worker cooperatives in Hungary are a relatively new phenomena in this industry, and represent a currently popular shift away from the older centralised system, the media may well present an enthusiastic view of this mode of procurement as a paradigmatic representation of the country's emerging political and economic systems.

#### (10) Property owners

The results of the analysis of the UK data (no data were available from the Hungarian survey) provided three distinguishing variables. These indicated that people who own property are less likely than others to think that poor quality buildings are caused by bad design (P1) or that large construction companies are reliable (REL1). They also believe that contractors work to relatively short deadlines (DEAD). This seems to suggest a greater emphasis on the maintenance and repair of existing buildings where smaller contractors are generally employed over relatively short periods, the original design not being seen to be a major factor in determining the state of the building.

### Summary and Discussion

The results of this study has provided some interesting and potentially useful insights into the nature of the image of the construction industries in both the United Kingdom

and Hungary. The method of analysis, it should be recalled, aimed to separate the various effects of age, gender, education, occupation, and various types of experience of the construction industry by the use of multivariate statistics. The results summarised below should therefore be regarded as independent, the fact that more males than females have construction industry experience for instance being effectively controlled by the technique to give a relatively pure measure of gender effects.

Differences in the opinions between younger and older respondents in the UK seem to be largely centred on differences in emphasis on the industry's processes and products, and the role of design and authority in influencing performance. In Hungary, these differences centre more on the role of the constructor, the size of firm being an important factor.

UK gender differences appear to be centred on the size of the operation, the level of creativity involved, the role of authority, and the importance of suppliers, resulting in an overall impression that the females in the study regarded construction as something of a cottage industry consisting of good small companies relying on their component suppliers and held together by authoritarian rule. Similar gender differences were found in Hungary in that females seemed to see considerable benefits in individual craftsmanship in terms of both quality and price but that they also thought that a greater degree of automation would achieve the same end.

Those UK respondents with a higher level of formal education were distinguished by their concern for the quality of buildings, particularly residential buildings, whilst their Hungarian counterparts were generally more discontented on several aspects of the construction products and processes, the blame being essentially placed on the quality of manufactured components and the abilities of those concerned in the construction process itself in terms of management, reliability, and productivity.

Differences in attitudes between UK workers in either managerial or clerical occupations seemed to depend on the degree of exposure of each to the immediate problems of the industry, with managers less inclined to believe that industrial buildings are of poor quality, that building work is expensive, or that insufficient care is taken to avoid pollution. The same groups in Hungary differed only on their attitudes to the quality of recent maintenance and renewal work.

UK respondents living in larger conurbations had opinions conditioned by city life generally - higher pay, bigger companies, and an impatience with the speed of building work caused by an acceptance of a greater pace of life in cities. Hungarian differences on the other hand exist mainly between those living in and out of the capital Budapest with Bps being more dissatisfied in terms of care, general quality, quantity of housing, maintenance and refurbishment. Bps were also found to have a higher regard for the management of large construction companies in terms of reliability, but that poor supervision, site discipline, and education of those involved are important problems although the level of wages was thought to be relatively higher in construction.

Differences between UK respondents with and without work experience in the construction industry were not as extensive as expected. The differences that were found centred on the industry's processes rather than products, and particularly in the importance of individual worker motivation as distinct from the influence of authority. This perceived impotence of 'controllers' by those working in the industry would seem to be an important issue worthy of further investigation in its own right with implications on the real influence of those in authority and construction management generally on the industry's performance. The Hungarian differences between these groups of respondents are of a similar nature, with a general reluctance to accept the influence of government controls. In addition, people with construction

work experience were generally happier with the industry on several counts - organisation and discipline, speed of repairs, price of construction work, and the environmental harmony of buildings. They also recognised the increased reliability of larger construction companies although at a greater price.

The differences recorded between both UK and Hungarian respondents with and without relatives working in the industry suggested that people with relatives in the industry are generally supportive of the industry's processes and products, perhaps contrary to media reports, but with little substantive justification. The general conclusion generated by this grouping is that these results are more a reflection of family allegiance than of the industry's image.

One step removed from direct industry experience is the general interest shown by people in the buildings around them. The impression is that the UK subjects who pay the most attention to buildings tend to have a higher regard for construction activity at site level, with a major influence being exerted by designers in construction companies, suggesting an emphasis on the creative aspects of the construction process and its dominating effect on performance. The equivalent Hungarian responses showed a greater distinction between design and construction, with the creative aspects of construction being more directly related to the products of the industry, with performance considered more in terms of process factors influenced by the educational level of the construction personnel involved.

Another type of indirect industry experience is the extent of DIY work undertaken by respondents. The UK results indicate that people's own efforts reveal some insights into what they view as popular misconceptions of the role of the legal system in quality control and the veracity of media reports. The equivalent Hungarian responses showed similar reservations concerning the role of authority to both UK DIY and construction workers generally but that media reports were generally favourable, a

finding attributable to the newness and political popularity of the Hungarian approach to activities of this kind.

Finally, the differences between UK respondents who do or do not own property were found to centre on the maintenance and repair of existing buildings where smaller contractors are employed over relatively short periods, the original design not being seen to be a major factor in determining the present state of the building.

Although very much in accordance with the aims and objectives of the work, in presenting these results the author is only too painfully aware of their voluminous nature. To reduce them much further however would be a dilution more than a distillation, and the avoidance of gross generality was one of the major factors motivating the work described. Nevertheless, some general observations are apparent, certainly concerning the UK results.

Quite clearly the role of personal experience has turned out to be a major factor in determining the image of the industry, and far more than the anticipated influence of the media, and often in rather unexpected ways. The main issue concerning those with some experience of doing (or passively observing) construction work, is the perceived irrelevance of legal control. For those closer to the action, this appears to extend to the impotence of control of any kind, individual motivation being seen as the dominating factor. Similarly, the emphasis of property owners on maintenance and repair issues indicates a reliance on personal experience in these matters, as do the family oriented attitudes of people with relatives in the industry, the relevance of education for the educated, and of a city style of behaviour for those living in cities.

The role of authority also appears in two of the construction experience free factors - age and gender - where both younger people and females have a higher regard for its influence, the interpretation of which is left to the reader.

### Methodological Notes and Concluding Remarks

Perhaps the greatest risk involved in research of this kind is that of observer bias - the tendency for the researchers' preconceptions and prejudices to distort the results. The researchers in this case were all from a construction industry background and all inclined to believe that the industry's image was in some way at odds with reality. In order to minimise the influence of this effect, the method of data collection and subsequent analysis was deliberately designed for maximal objectivity, by non contact postal questionnaires completed by randomly selected subjects and analysed in a rigorously routine manner. Only the generation of the questions in the questionnaire and the interpretation of the results have been left open to the researchers judgement and intuitions.

A major potential analytical problem created by the approach used is the difficulty in grading the level of subjective responses between the various aspects of the construction industry under study. Categorisation of the response variables tends to make comparison between averages rather meaningless. Examination of the differences between cross sectional groupings of respondents, however, effectively overcomes this problem in identifying the **relative** differences between the independent variables. Thus, for instance, if younger people are found more likely than older people to think that contractors are in a position to improve construction industry performance (and *vice versa*) we can be assured that the perceived role of contractors in this issue is an important factor *per se*.

What also clear is that where significant differences of this kind are found between cross sectional groupings, the differences must be perceptual rather than 'real', for it is entirely illogical that both younger and older people can both be correct on this issue.

Naturally what is or is not the 'real' situation cannot be determined by this approach, which is solely concerned with the perceived image of the industry.

Other differences, such as the apparently higher regard of younger people for good conditions at work are less obviously concerned with perception but nevertheless identify perceptual differences in, for example, **what** are good working conditions and **why** these are considered to be in some way preferable. Differences of this type are far more a psychological than an industrial issue and although of some relevance to the research, particularly in such matters as recruitment prospects, they are not central to the theme of the paper.

Another point that the reader may wish to note is the vast differences between the UK and Hungarian results of the study. These can only be attributed to what we may call differences in 'culture', perhaps an aspect with important implications in view of the increasing influence of EC directives on intercultural activities. These differences are more directly addressed by Gacsalyi *et al* (1990) in overall terms but are again highlighted by this cross sectional approach. The results reported here certainly raise many questions. Why, for instance, do fundamental differences exist on basic variables such as age, gender, and education? Bearing in mind that the method of analysis is intended to remove such influences as knowledge of the industry, it is at least disconcerting to find residual differences of this kind and poses the question of what will the French, German, Italian populace think of the UK industry both as potential recipients and providers of construction services? Clearly, if the work was to be extended further, answers to this question may be forthcoming.

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