UK CERAMICS INDUSTRY
REPORT ON THE 2013 FIRM SURVEY

Understanding the role of institutions, social capital and inter-firm networking within the North Staffordshire ceramics district

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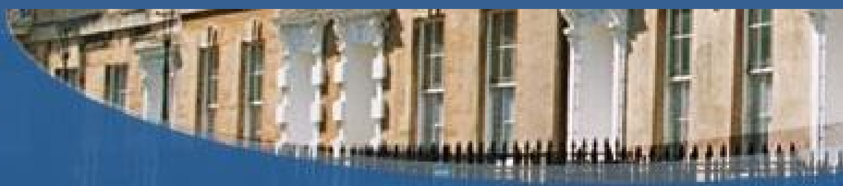

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Introduction

During the summer of 2013, we conducted a survey of UK ceramics firms, the majority of which are based in the North Staffordshire industrial district. The survey was designed to canvass opinion on the role of industry institutions (such as the British Ceramic Confederation and CERAM), social capital and business networking within the ceramics industry (in future research, we intend to explore how these factors impact upon firm performance). We were also interested in the extent to which ceramics firms participate in wider initiatives to develop the UK ceramics industry and the North Staffordshire district. We also sought to identify some of the perceived competitive strengths and weaknesses of North Staffordshire as a location for ceramics manufacture.

In total, we received 112 completed survey responses, which represented a very respectable response rate of 40%. This report is a summary of the data obtained from the returned survey responses. Most of the questions used Likert (1-7 point) scales in seeking opinions on various issues. We present this data in different ways (depending on the issue), although largely we report the mean (average) scores. The report is structured around the different themes we explored within the survey, for which we present the aggregated survey responses, together with some brief comments as to the main findings. Of these 112 firms, 33 firms had indicated they were members of the British Ceramic Confederation. In presenting some of the results (Section 2 onwards), we have thus provided a separate break-down of the mean (average) scores of BCC and non-BCC members for comparison, and we also test for statistical differences. Full details on the statistical methods used and a breakdown of respondent characteristics are provided in the Appendices.

Finally, we should note that the aim of this report is merely to present the data collated in an appropriate form. The issues covered are likely to be of topical interest to the industry and the North Staffordshire district. However, it is not the report's intention to make analytical inferences or judgments from the results or indeed to offer any policy advice. Rather, the aim of the report is to present a snapshot picture of current opinion within the industry on certain issues, and allow your firm to make your own (suitable) comparisons with the data. We hope this is of interest to you.

Section 1

Location: Competitive Strengths and Weaknesses

In Table (1) we report the raw data survey responses as they relate to North Staffordshire based ceramics firms' perceived levels of satisfaction – over 17 categories – with their location[1]. The Likert scale used was 1-5, with 1 indicating 'very dissatisfied' and 5 'very satisfied'. Columns 1-5 report the number of respondents awarding a particular score (e.g. *for labour costs, 14 respondents indicated a score of 5: very satisfied*). The final two columns report the mode (the most common response) and mean (average) scores for each category respectively.

Table (1): *Perceived strengths and weaknesses of North Staffordshire for Ceramics*

Category / Level of satisfaction (1 to 5 scale)	*Very Dissatisfied*		*Neutral*		*Very Satisfied*		
	1	2	3	4	5	Mode	Mean
Labour costs	0	2	30	39	14	**4**	**3.76**
Availability of highly skilled workers	3	15	25	33	8	**4**	**3.33**
Education and training opportunities	5	21	34	21	3	**3**	**2.95**
Access to Research & Development facilities	1	14	40	25	5	**3**	**3.22**
Access to finance and venture capital	11	13	48	13	0	**3**	**2.74**
Access to client firms	8	12	39	20	4	**3**	**3.00**
Access to supplier firms	2	12	20	31	19	**4**	**3.63**
A critical mass of manufacturers in the same industry	0	9	43	27	7	**3**	**3.37**
A network of trustworthy local client firms and suppliers	2	9	29	32	13	**4**	**3.53**
Knowledge transfer within the region	3	14	37	26	6	**3**	**3.21**
Ability to 'benchmark' against competitors	4	14	43	21	1	**3**	**3.01**
A network of business institutions	2	14	40	23	6	**3**	**3.20**
The region's reputation for ceramics	3	4	10	38	30	**4**	**4.04**
Infrastructure (transport and communication)	4	10	19	40	13	**4**	**3.56**
Local Government Regulations	11	15	53	5	1	**3**	**2.65**
Ease of planning for (new or expanded) factory/manufacturing / quarry facilities	8	10	61	7	0	**3**	**2.78**
Relations with the local community	0	6	34	36	9	**4**	**3.56**

From Table (1), it is perhaps useful to interpret responses in the middle of the scale (a neutral score of 3), as reflecting respondents' indifference towards a particular category, while Likert scores above/below indicate high(er)/low(er) levels of satisfaction. In summary, district firms

[1] This question was asked of North Staffordshire based firms only.

were fairly or highly satisfied with labour costs (*mean*: 3.76), infrastructure (3.56), the availability of skilled workers (3.33), access to suppliers (3.63), local ceramics networks (3.53) and relations with the locality (3.56). Perhaps not surprisingly and given the district's history, firms maintain a strong degree of satisfaction with the region's external reputation for ceramics (4.04). We might therefore (tentatively) regard these categories as perceived sources of the district's enduring strengths. In terms of perceived weaknesses, there are concerns regarding the current level of education/training in the industry (2.95) and access to external finance (2.74). There were also related concerns with local government regulations (2.65) and ease of planning for new (or expanded) facilities (2.78). Overall, both the dispersion of responses across the categories, together with the mean and mode results suggest – with one or two exceptions - a fair degree of satisfaction for the district as a location for ceramics production.

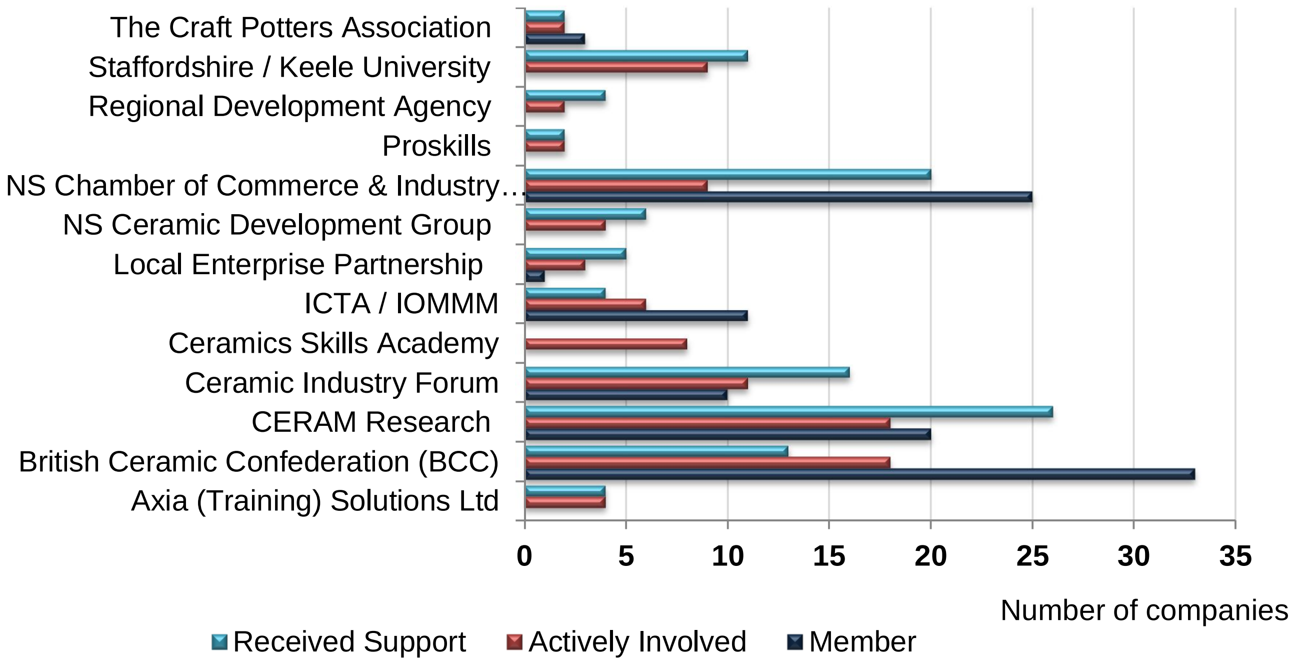
Section 2

Links with Institutions

The ceramics industry is served by a number of institutions, the majority of which are located in North Staffordshire. One of the main aims of the survey was to explore the extent to which UK ceramics firms engage with these institutions and the services they predominantly use. A further question asked for firms perceptions of these institutions.

In Figure (1), we report the raw data responses with regards to firms' links with the various institutions in the industry. These are reported in terms of a) being a member, b) active involvement and c) received support.

Figure (1): *Firms Links with Institutions*



The data in Figure (1) appears to confirm the industry's most important institutions in terms of membership and support are the BCC, CERAM and NSCCI. This is not surprising given their prominance within the industry and North Staffordshire.

A related issue is the extent to which the UK ceramics firms utilise the various services and benefits provided by these institutions. For this question, we used a 7 point scale where 1 represented 'No benefit', and 7 represented 'A great benefit'. The mid-point of the scale is 4, reflecting 'medium benefit'. In Table (2) we report the mean scores (and standard deviation, a measure of the variation in the responses received) for each service/benefit, for i). *all firms*, ii). *for just BCC members* and iii). *non-BCC members*. Finally, the reported T value allows us to test whether the mean scores for BCC and non-BCC members are statistically different (see Appendix 2 for an explanation of what this means).

Table (2): *Services/Benefits acquired from Industry Institutions*

Category / Level of benefit (1 to 7 scale; low benefit - great benefit)	***All Companies***		***BCC Members***		***Non-BCC Members***		
	Mean	SD	Mean	SD	Mean	SD	T value
Access to and sharing of information relevant to the industry	**3.24**	1.85	**4.48**	1.52	**2.49**	1.62	7.55***
Access to business and legal advice	**2.59**	1.57	**3.06**	1.46	**2.31**	1.59	2.89***
Access to financial support	**2.07**	1.40	**1.85**	1.06	**2.20**	1.57	1.40
Provision of collective marketing services (trade fairs/exhibitions)	**2.69**	1.56	**2.76**	1.62	**2.64**	1.54	0.44
Provision of training facilities and/or specific training courses	**2.65**	1.60	**3.21**	1.45	**2.32**	1.61	3.41***
Support for own firm R&D and design activities	**2.47**	1.62	**2.91**	1.57	**2.20**	1.60	2.68***
General R&D activities carried out for the benefit of all firms in the cluster	**2.40**	1.52	**3.09**	1.53	**1.98**	1.37	4.45***
Provision of an environment where members can get to know each other/Industry conferences	**2.86**	1.70	**3.79**	1.63	**2.31**	1.50	5.69***
Provision of a venue where members can exchange ideas and information	**2.64**	1.63	**3.45**	1.66	**2.15**	1.42	5.12***
Assistance with the settlement of disputes or disagreements with other firms/trade unions	**2.10**	1.43	**2.39**	1.60	**1.93**	1.30	1.90*
Setting up of collaborations to access local, regional or national government initiatives	**2.66**	1.75	**3.58**	1.70	**2.09**	1.55	5.62***
Participation in a pressure group to access public funding	**2.28**	1.58	**2.94**	1.61	**1.91**	1.46	4.00***
Participation in lobbying UK government/EU over issues relating to the UK ceramics industry	**3.16**	2.18	**5.18**	1.55	**1.91**	1.46	12.84***
Technical Advice to Members	**2.91**	1.87	**4.06**	1.90	**2.22**	1.49	6.93***
Industry Benchmarking activities	**2.38**	1.57	**3.09**	1.55	**1.94**	1.42	4.55***
Publication of trade journals / newsletters	**2.45**	1.55	**2.88**	1.45	**2.19**	1.57	2.68***
Management training courses	**2.37**	1.55	**2.75**	1.48	**2.13**	1.56	2.37**

* Difference between BCC members and non-members significant $p < 0.1$.* (10% margin of error). ** Difference between BCC members and non-members significant at $p < 0.05$ (5% margin of error). *** Difference between BCC members and non-members significant at $p < 0.01$ (1% margin of error).

The data in Table (2) suggests that, in the aggregate, UK ceramics firms do not perceive great benefits from the many different services/benefits that the various institutions offer; no mean score is above 3.24 (Access/Sharing of information (Column 2)), which is below the mid-point score of 4. However, BCC members do appear to receive higher levels of benefits across all categories than non-BCC members, with the mean scores (for each category) being statistically different (higher). The only exceptions relate to finance and collective marketing, where no statistical differences were found (see Appendix 2 on statistical inference). These results probably reflect the fact that BCC members are more able to access services more easily, not only within the BCC but possibly through their wider connections (with other institutions).

In Table (3), we report UK ceramics firms' perceptions of the industry's institutions. Respondents were asked to the extent to which they agree and disagree on a 7 point Likert scale with several statements relating to specific institutions, and then the North Staffordshire institutions more generally. The mid-point (neutral) score is 4. Table (3) again reports the mean scores (and standard deviation) for *all firms*, *just BCC members* and *non-BCC members.* Finally, the reported T value indicates whether the mean scores for BCC and non-BCC members are statistically different.

Table (3): *Perception of Ceramics Institutions*

Category / Level of agreement (1 to 7 scale; strongly disagree-strongly agree)	*All Companies*		*BCC Members*		*Non-BCC Members*		
	Mean	SD	Mean	SD	Mean	SD	T value
The BCC represents the interests of all manufacturers within the industry	**4.69**	1.54	**5.88**	0.89	**4.00**	1.38	8.33***
The BCC are a strong lobbying group for the UK ceramics industry	**4.83**	1.50	**6.06**	0.97	**4.06**	1.23	8.93***
The BCC are open and responsive to our needs	**4.58**	1.43	**5.70**	1.10	**4.01**	1.14	8.14***
The BCC are accountable to its members	**4.63**	1.40	**5.64**	1.11	**4.00**	1.18	7.27***
The services provided by CERAM are important for our firm's business	**4.44**	1.78	**5.12**	1.76	**4.04**	1.67	3.98***
Ceramics related forums encourage an open dialogue about industry issues	**4.13**	1.19	**4.36**	1.25	**3.98**	1.15	1.68*
North Staffs' business institutions are responsive to the needs of manufacturers	**4.15**	1.47	**5.06**	1.26	**3.62**	1.32	6.04***
North Staffs' business institutions are widely accessible	**4.24**	1.33	**5.13**	1.12	**3.72**	1.17	6.25***
North Staffs' business institutions are accountable to their members	**4.27**	1.20	**4.97**	1.20	**3.85**	1.00	5.21***
When seeking support, our firm prefers to liaise with business institutions as opposed to other manufacturers	**4.19**	1.52	**4.81**	1.42	**3.83**	1.46	3.86***
Business institutions aid and promote the development of the North Staffs ceramics industry	**4.51**	1.37	**5.26**	1.18	**4.07**	1.29	5.05***

Overall, the results suggest industry institutions are fairly well regarded, with mean scores for all statements exceeding 4. The BCC are particularly highly regarded by all firms in terms of their lobbying activities for the ceramics industry (4.83) and as representing member interests (4.69). There is also a (marginal) favourable view of all the business institutions in North Staffordshire (4.51). Finally, for all statements the mean scores of BCC members are higher than non-BCC members and these differences are statistically significant. This most likely reflects the closer involvement/engagement that BCC members have with the industry institutions.

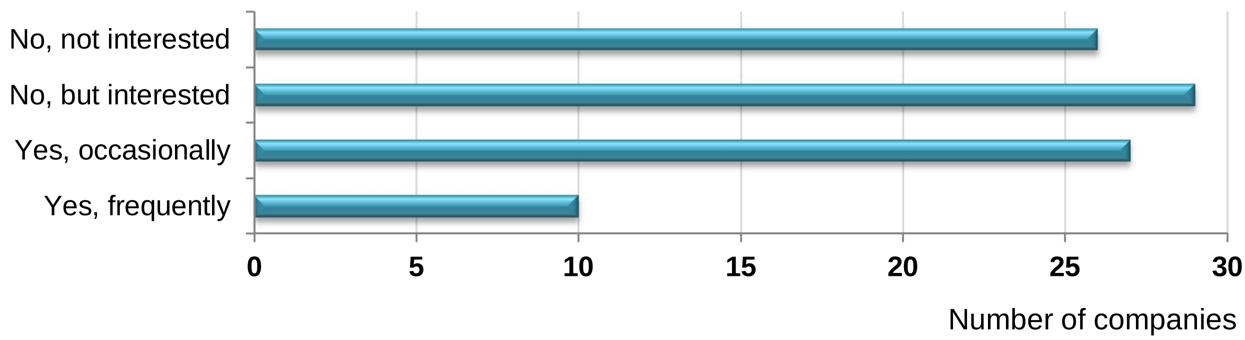
Section 3

Firms involvement in developing the ceramics industry

In this section, we consider the extent to which respondent firms have been interested and become engaged with developing the North Staffordshire ceramics industrial district. These are an interesting set of questions since they reveal the extent to which ceramics firms are willing and able to participate in collective initiatives that might develop the industry and the district.

In this respect, Figure (2), indicates the extent to which firms expressed an interest in the development of the UK ceramics industry at industry events over the last 5 years (2008-2013).

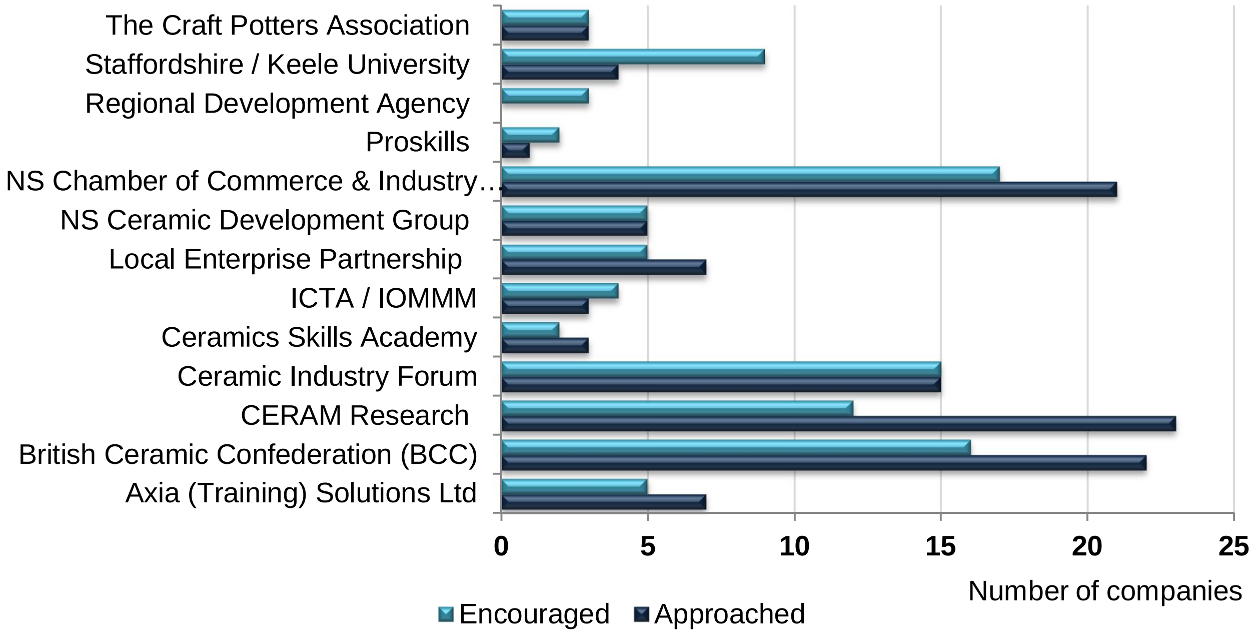
Figure (2): *Expression of Interest in Development of Ceramics industry*



Overall, 37 firms (33% of our sample) indicated that they had (at least) expressed interest in the wider development of the industry. However, a further 29 respondents did indicate they would be interested in the industry's development (and possible initiatives). This suggests there may be potential for more engagement between firms over the wider development of the industry in future.

In Figure (3), we document the number of firms which indicated they had been approached and/or encouraged by the various institutions to participate in projects/initiatives in relation to the development of the North Staffordshire district. Once again, the main institutions are the BCC, CERAM and the NSCCI. The now defunct Ceramics Industry Forum was also relatively important and it will be interesting to see whether the new Ceramics Development Group will also play a key role in this regard. Overall, however, less than 25 firms indicated they had been approached by each of these instutions. Given the indication of potential interest (Figure (2)), there might be further scope for these industry institutions to encourage wider involvement in industry iniatives.

Figure (3): *Number of Firms Approached/Encouraged by Industry Institutions to participate in industry initiatives*



A related issue is the extent to which ceramics firms feel they have been involved in the decision-making processes of key policy inititatives in the development of the North Staffordshire district over the period 2008-2013. These results are produced in Figure (4), which suggest very few firms felt involved in the final decision-making process.

Figure (4): *Extent of Involvement in Decision Making over policy*

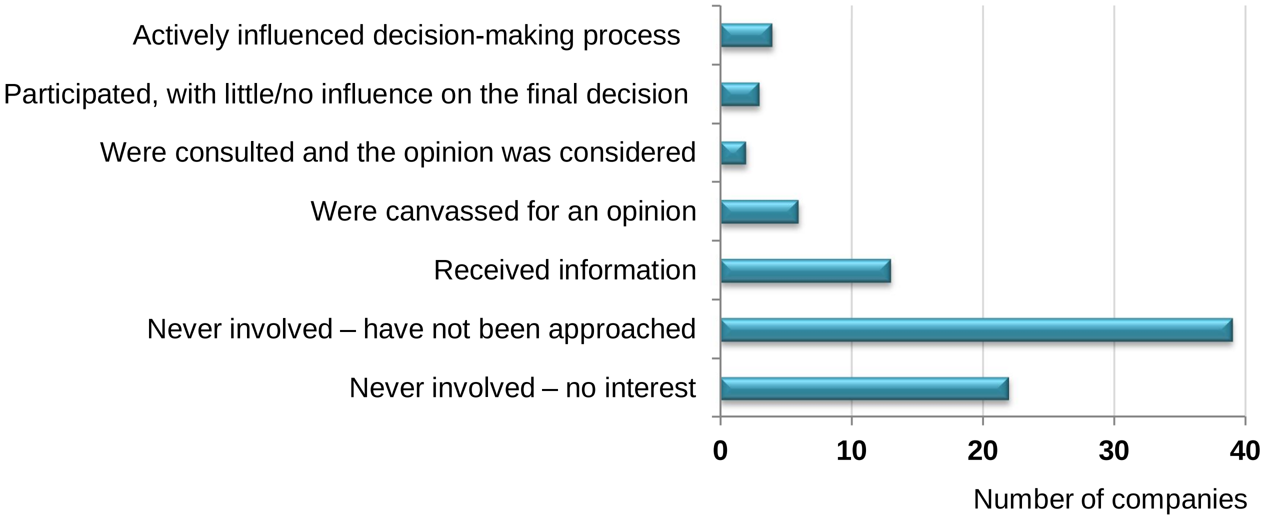


Table (4): *Involvement in Various Industry Initiatives*

Category / Level of Involvement (1 to 7 scale; low involvement-high involvement)	***All Companies***		***BCC Members***		***Non-BCC Members***		
	Mean	SD	Mean	SD	Mean	SD	T value
The collective marketing/promotion of the your part of the UK ceramics industry	**2.09**	1.77	**2.73**	1.98	**1.76**	1.56	3.58***
The management and organisation of trade fairs	**2.07**	1.76	**2.37**	1.94	**1.92**	1.66	1.63
Open access ceramic research and design centres	**1.67**	1.18	**1.81**	1.19	**1.59**	1.18	0.94
The development of training facilities	**1.63**	1.30	**2.32**	1.72	**1.26**	0.81	4.88***
Regulatory issues within the ceramics industry	**2.04**	1.75	**3.55**	2.13	**1.25**	0.71	10.26***
The development of industrial tourism related to ceramics	**1.46**	1.15	**1.65**	1.36	**1.36**	1.03	1.30
Regeneration projects within North Staffordshire	**1.47**	1.32	**1.84**	1.75	**1.27**	0.98	2.46**
Improvements in your region's infrastructure and transportation networks	**1.24**	0.66	**1.39**	0.76	**1.17**	0.59	1.30
The development of reclaimed land for commercial purposes within your region	**1.39**	1.07	**1.90**	1.64	**1.12**	0.38	4.30***

* Difference between BCC members and non-members significant p < 0.1.* (10% margin of error). ** Difference between BCC members and non-members significant at p < 0.05 (5% margin of error). *** Difference between BCC members and non-members significant at p < 0.01 (1% margin of error).

In Table (4), we report the extent to which UK ceramics firms were involved in various initiatives in relation to the development of the industry and the North Staffordshire district. Respondents were asked to the extent to which they were involved on a 7 point Likert scale with several initiatives and/or wider development issues. Lower scores indicate low involvement and higher scores indicating high involvement, with the mid-point score (meduim involvement) being 4. Table (4) again reports the mean scores (and standard deviation) for *all firms*, *just BCC members* and *non-BCC members.*

Overall, the mean scores generally indicate a low level of firm engagement (with mean scores around 2) with regards to the various initiatives associated with developing the industry and/or district. The mean scores were marginally higher for BCC members vis-à-vis non-BCC members, but these only statistically significant in five cases (collective marketing, developing training facilities, regulatory issues, regeneration projects and developing reclaimed land).

Section 4

Social Capital and Networking

In this section we present the results on social capital and networking. In a business context, social capital captures the nature of a firm's external relations with other actors (in particular, other firms and institutions). For instance, 'trust' and 'shared values' are elements of social capital. The role of social capital is often debated, although it is widely accepted that more social capital between firms can be beneficial, particulartly in industrial districts, as it can, for example, lead to cross-fertilisation of knowledge and ideas, and greater co-operation which may improve firm performance. Social capital can be extremely difficult to measure, since it occurs on a daily basis in business relations and from an empirical perspective, is unobserved. However, firm surveys can be useful in this respect, since they can ask respondents to rate (on a scale) several aspects of social capital.

In Table (5), we asked a series of questions relating to the 'shared ambitions' or 'vision' of North Staffordshire firms. A 7 point Likert scale was again utlised, with low rating indicating disagreement and high ratings indicating agreement. The neutral score is again 4 and Table (5) reports the mean scores (and standard deviation) for *all firms*, *just BCC members* and *non-BCC members, with* the T value indicating whether the mean scores for BCC and non-BCC members are statistically different.

Table (5): *Shared Ambitions*

Category / Level of Agreement (1 to 7 scale; strongly disagree-strongly agree)	*All Companies*		*BCC Members*		*Non-BCC Members*		
	Mean	SD	Mean	SD	Mean	SD	T value
The people in your firm share the same ambitions and vision as other North Staffs ceramics manufacturers	**4.24**	1.32	**4.52**	1.40	**4.11**	1.28	1.72*
Your firm's future is related to that of other North Staffs ceramics manufacturers	**3.81**	1.89	**3.78**	1.99	**3.82**	1.86	0.15
There is a kind of shared strategy for North Staffs ceramic manufacturers	**3.38**	1.40	**3.26**	1.46	**3.44**	1.38	0.72
People are encouraged and motivated to pursue the shared goals and strategy of the North Staffs Ceramics district	**3.46**	1.48	**3.15**	1.46	**3.61**	1.47	1.81*

* Difference between BCC members and non-members significant $p < 0.1$.* (10% margin of error). ** Difference between BCC members and non-members significant at $p < 0.05$ (5% margin of error). *** Difference between BCC members and non-members significant at $p < 0.01$ (1% margin of error).

Overall, the results reveal that firms did not generally feel there was a shared vision or strategy for the North Staffordshire district and the industry, with mean scores below the neutral score of 4. Indeed, BCC members recorded lower levels of agreement on 3 of the 4 statements vis-à-vis non-BCC members, and on shared strategy this difference was marginally significant (i.e. with a 10% margin of error).

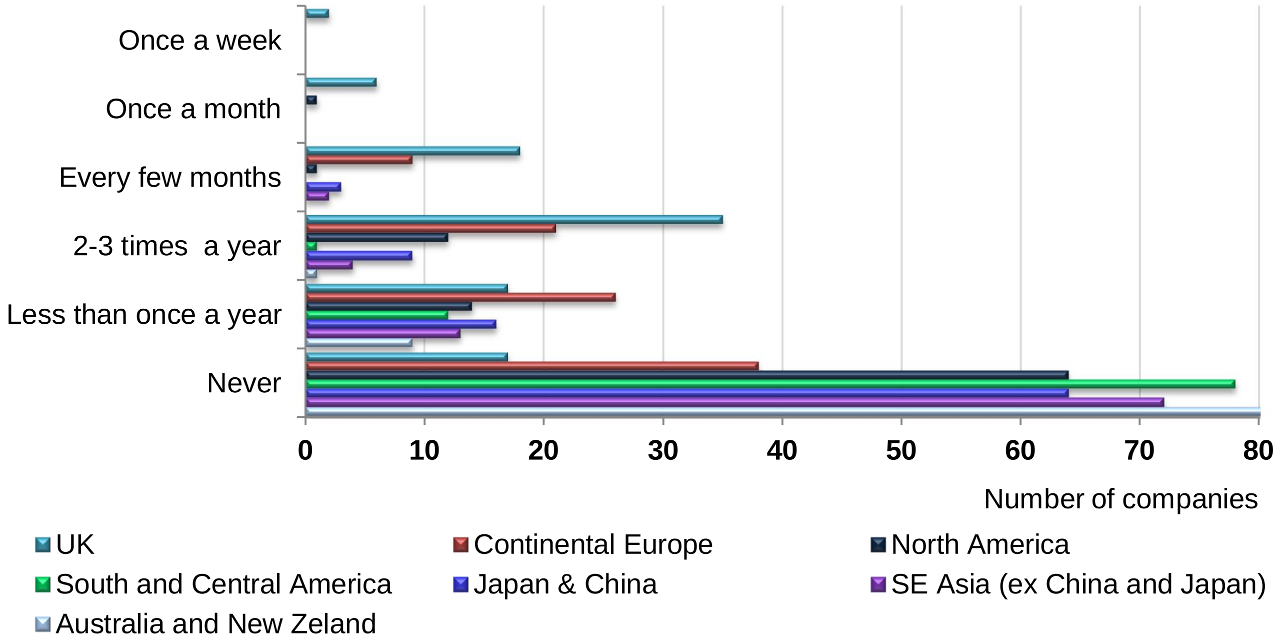
Table (6): *Social Capital and Networking*

Category / Level of Agreement (1 to 7 scale; strongly disagree-strongly agree)	*All Companies*		*BCC Members*		*Non-BCC Members*		
	Mean	SD	Mean	SD	Mean	SD	T value
There is a trusting climate among ceramics manufacturers in the NS	**4.22**	1.27	**4.58**	1.06	**4.05**	1.33	2.24**
There is a significant information exchange about products and technologies with suppliers and customers	**3.85**	1.28	**3.92**	1.23	**3.82**	1.31	0.43
There is a significant exchange of information about market access with other local manufacturers	**3.56**	1.24	**3.65**	1.20	**3.52**	1.26	0.58
We collaborate with other ceramics manufacturers in North Staffs	**3.74**	1.67	**3.48**	1.53	**3.87**	1.73	1.45
There is an international network among customers and suppliers	**3.72**	1.39	**3.58**	1.53	**3.79**	1.32	0.88
There is a high degree of common identification among ceramics manufacturers in North Staffs	**4.04**	1.29	**4.00**	1.23	**4.06**	1.32	0.24
We socialise with other people in the North Staffs ceramics industry	**3.75**	1.69	**3.52**	1.70	**3.87**	1.69	1.28
We regularly communicate with other people/manufacturers in the North Staffs ceramics industry	**4.34**	1.85	**3.93**	2.14	**4.53**	1.68	2.13**
I am comfortable receiving appropriate advice from other ceramics manufacturers *based in* North Staffs	**4.94**	1.55	**5.07**	1.05	**4.88**	1.74	0.73
I am in regular (international) contact with other ceramics manufacturers based *outside* the UK	**3.77**	2.05	**4.43**	2.03	**3.47**	2.00	3.24***
I am comfortable receiving appropriate advice from other ceramics manufacturers based *outside* the UK	**4.71**	1.56	**4.93**	1.41	**4.60**	1.63	1.24

* Difference between BCC members and non-members significant $p < 0.1$.* (10% margin of error). ** Difference between BCC members and non-members significant at $p < 0.05$ (5% margin of error). *** Difference between BCC members and non-members significant at $p < 0.01$ (1% margin of error).

The results in Table (5) relate to a set of broader questions on social capital and inter-firm networking (within the district and outside the district). Again, the mean scores (for all firms) appear to oscillate above/below the mid-point (neutral) score of 4. The most important statement(s) in terms of networking relate to receiving external advice from partners within and outside North Staffordshire. The mean scores for BCC and non-BCC members are reported and these appear to be significantly different (statistically) in three cases (contacts with international firms, communication within the district (higher for non-BCC firms) and with regards to the perception of trust). Overall, both Tables (5) and (6) appear to suggest ceramics firms are generally ambivalent about the degree of social capital existing within the industry.

Figure (5): *Wider Networking: Firm visits to business seminars/conferences/trade fairs*



Finally, Figure (5) provides some details of the extent to which UK ceramics firms engage in wider networking activities such as business seminars/conferences (such as training and technology related events), trade fairs or business visits both within the UK and further afield. Most firms (85% of respondents) attend at least one event during a typical year.

Section 5

Concluding Comments and Future Research

This report has presented the findings from our recent survey of the UK ceramics industry. There are several generic observations from the data. The first is that, compared to non-BCC members, BCC members tend to place a higher value on the role of industry's various institutions and they also appear to benefit more from the services such institution offer. In addition, BCC member firms tend to (marginally) participate in more industry wide initiatives than non-BCC members. This is not surprising, given that BCC membership potentially opens up wider channels and networks for member firms to operate in.

With regard to the strategic direction of the industry, few firms felt actively involved in the final decision-making regarding new initiatives/policies in developing the North Staffordshire district. However, there did seem to be significant interest from firms to become involved in the wider development in the future. This might be an opportunity to encourage wider participation in such initiatives in the future (see Section 3). Finally, the report revealed a degree of ambivalence (by firms) towards the level of social capital and wider collaborative networking within the district. In related research, based on interview data with Senior Managers and high level representatives from the industry's institutions, we did uncover evidence of changing attitudes towards greater collaboration and networking between some firms, particularly with regards to addressing concerns over skills and energy. As these types of collaboration bear fruit, it will be interesting to observe whether this will be reflected in (wider) industry perceptions towards social capital.

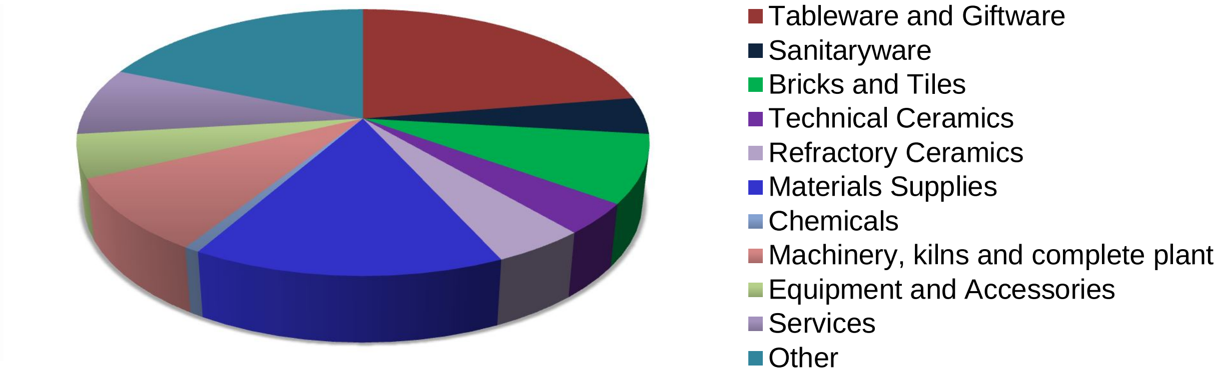
This report and the data contained within it provide the basis for our future academic research projects. We are, for instance, particularly interested in how some of the data measures (for instance, on social capital) correlate with the measures obtained on firm performance (for instance, sales and innovation - see Appendix 1 for details of these measures). We are also interested in the factors that influence why some ceramics firms get involved (and others not) in industry wide initiatives. The data obtained may hopefully shed some light on these (and other issues). Once we have conducted these analyses we intend to again disseminate the results to you.

Section 6

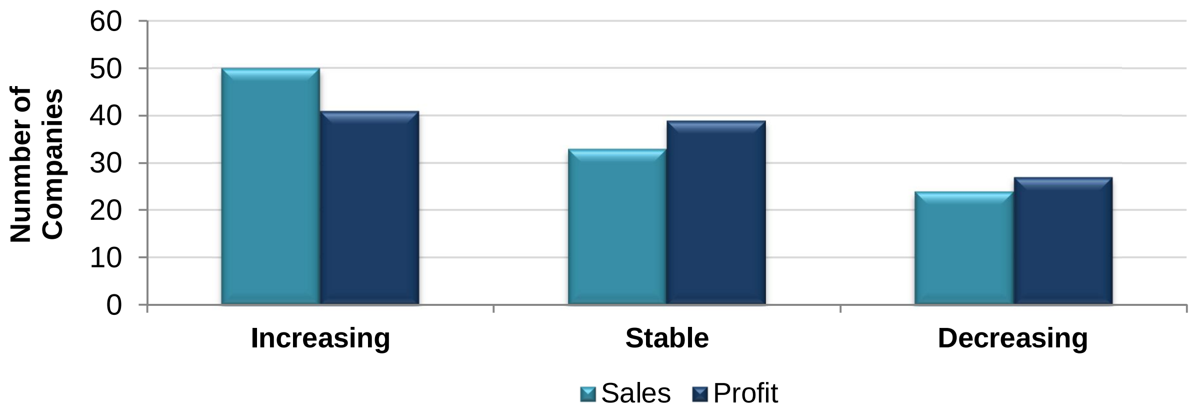
Appendix 1 – Data Collection and Description of Respondent Firms

The UK ceramics survey was conducted between April and September 2013. All ceramics firms (from all ceramics sub-sectors) based in North Staffordshire and British Ceramic Confederation members were asked to participate. A response rate of 40% was achieved, resulting in 112 returned surveys. The following charts and tables provide some contextual background information on the respondent firms.

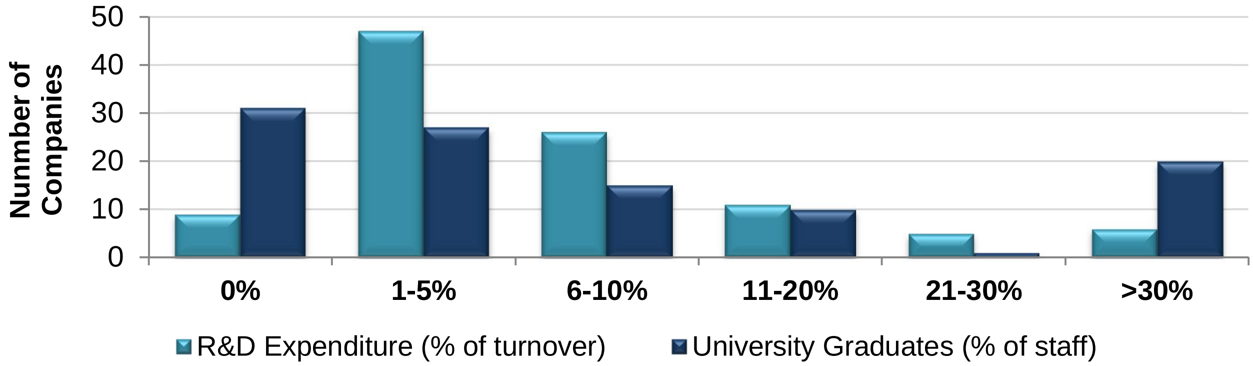
The pie chart below shows a break-down of the proportion of respondents from each sub-sector.



The following chart details the number of respondent firms who indicated whether their sales and profits had been increasing, stable and falling over the last 5 years (2008-2013).



The following chart provides details of R&D expenditure (as a % of turnover) and the employment of graduates (as a % of staff) in our respondent firms.



The following Table (A1) provides some details on the (perceived) extent of innovative activities of ceramics across all sub-sectors over the previous 5 years (2008-2013). The scale ranged from 1-7, with 1 indicating no innovative activity, and 7 a 'great many' innovations. Columns 1-7 report the number of respondents awarding that score (i.e. for the first statement, 14 respondents indicated a score of 1: no innovative activity). The final two columns report the mode and mean scores respectively. Please note that as these are a raw data scores and do not differentiate by ceramics sub-sector; the potential for innovation will clearly differ across sub-sectors. Furthermore, this data focuses on the number of innovations; it does not capture the actual 'value' of innovation.

Table A1: *Innovation Patterns*

Category / Level of magnitude (1 to 7 scale; none-great many)	***None***		***Great Many***						
	1	***2***	***3***	***4***	***5***	***6***	***7***	Mode	Mean
Significant new product lines introduced	14	16	13	13	17	6	21	**7**	**4.07**
Significant changes/improvements to existing product lines	10	22	11	17	23	6	11	**5**	**3.85**
Significant new equipment/technology introduced in the production process	24	26	18	13	13	1	7	**2**	**2.96**
Significant new input materials introduced in the production process	30	32	13	13	10	0	3	**2**	**2.53**
Significant organisational changes/improvements made in the production processes	26	16	23	12	8	8	8	**1**	**3.16**

In Table A2, we report respondents views on their product strategy. Again, this is across all ceramics sub-sectors, and the scale ranged from 1-7, with 1 indicating Strongly Disagree and 7

Strongly Agree. Columns 1-7 again report the number of respondents awarding that score. The final two columns report the mode and mean scores respectively.

Table A2: *Diversification*

Category / Level of agreement (1 to 7 scale; strongly disagree-strongly agree)	***Strongly Disagree***			***Neutral***		***Strongly Agree***			
	1	2	3	4	5	6	7	Mode	Mean
We command a higher price than other manufacturers by making distinctive, high quality products	4	2	1	17	26	29	22	**6**	**5.32**
Our prices are among the lowest in the industry	25	26	11	22	7	6	4	**2**	**2.94**
We are the first company to introduce innovative products, new services or technologies	4	14	5	38	20	12	9	**4**	**4.25**
We focus upon producing products for a number of narrow, customer group(s) (i.e. market 'niches')	3	7	5	15	14	30	26	**6**	**5.24**

Appendix 2 - Likert Scales, Means and Statistical Differences

In the survey, respondents were asked to rate several statements (known as survey items) on a Likert scale of 1-7, where 1 represented Strongly Disagree and 7 represented Strongly Agree. (The exception is the question relating to the North Staffordshire location (Table 1), which used a Likert scale of 1-5).

In Tables (2) to (6), for each statement we aggregate these scores across all respondent firms and use this aggregated score to calculate a mean. We then separate BCC and non-BCC member firms and calculate these firms' mean scores for each statement. Thus in Tables (2) to (6), the first column provides the mean score for all firms, the second column for BCC members only and the third column, for non-BCC members.

As you can see, from say Table (3), the mean scores (for all statements) differ between BCC and non-BCC members. If these scores represented data from the whole population (i.e. all UK ceramics firms), then we could say that these scores (across the population) differ. However, we do not have data on the whole population; the survey drew a response rate of 40%. Thus, as our survey data is only a sample of the population of UK ceramics firms, it is not enough to say that the mean scores differ between BCC and non-BCC members. In order to make an inference (from our survey data) for the whole population, we need test whether these sample mean scores are 'statistically different'. We do this by conducting a 't-test' in comparing the two mean scores (BCC and non-BCC scores) for each statement. The statistical properties of this test can be found at http://en.wikipedia.org/wiki/Student's_t-test. This gives us a Test statistic or T value.

For each statement, the test statistic (T-value) is reported. This test statistic is compared to the published T-values on statistical inference. The asterisks (*) by each reported test statistic indicate the level of significance, which is in *effect the margin of error in accepting that the sample mean scores differ* i.e. 1%(***), 5%(**), 10%(*). Clearly a 10%(*) confidence interval has a higher margin of error (in inferring that means differ) than a 1%(***) confidence interval. Thus a statement with a (high) test statistic and accompanied by three asterisks (***) indicates that the sample mean scores (between BCC and non-BCC members) differ and this difference is highly statistically significant. In effect, we are saying that if we had data for the whole population (for this statement), then we are highly confident that the population means would differ. Finally, if a test-statistic has no asterisks reported after it, then even if the sample means differ (in the table), these differences are not statistically significant. Further details on confidence intervals and statistical inference are available at http://en.wikipedia.org/wiki/Confidence_interval

About The Authors

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