

MODELLING THE SUPPLY AND DEMAND FOR CONSTRUCTION AND BUILDING SERVICES SKILLS IN THE BLACK COUNTRY

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Abstract: Available data has confirmed the peculiarities of the Black Country as a sub-region where: unemployment is higher at 5.2% than regional average of 3.9% or UK average of 3.3%; construction is predicted to decline at 0.6% per year compared with national average of 0.1%; the proportion reliant on income support is 32% for the Black Country versus 27% for the West Midlands and 24% nationally. This paper discusses these issues as a prelude to the formulation of a demand led model for construction skills supply in the region. The variables that would be included in the model have been identified and a pilot study conducted, with indications of a skills mismatch between current supply and demand for construction skills. A major structured survey is currently being conducted and would lead to the development of an empirical model, which would then be validated to conclude the study.

Keywords-construction skills shortage, manpower modelling, Multiskilling, and the Black Country.

1. INTRODUCTION

The peculiarities of the construction and building services industry cannot be over emphasized (Hillebrandt, 1995; Harvey and Ashworth, 1997; Koskela, 2000; Koskela, 2003; Hillebrandt, 2003). Because it is more of a project-based industry, employees are persistently faced with finite job placements scenarios. The life span of an engaged tradesman is arguably always less than or equal to that of it's entire Project. The industry today is pigeonholed as one with a huge mobile 'pool of labour' upon which constructors rely on for steady supply of construction and building services skills at any given time (Uwakweh and Malony, 1991). However, in the absence of a manpower planning process, which is viewed arguably as a management tool Briscoe and Wilson (1993), there is bound to be disequilibrium in the supply and demand for traditional and new construction and building services skilled tradesmen. Thus, resulting in fluctuating periods of labour shortages and surpluses. The severity of these periods of shortages on any sector in this regard, the construction and building services industry is dependent on its period. Some likely symptoms of the effect of disequilibrium in the supply and demand for construction and building services skills include: skills mismatch; skills shortages; unemployment; excessive wages; job losses, high claimant rates etc. Regardless, most constructors still assume there is always a pool of labour readily available at any given time to meet the demand for construction and building services tradesmen (skills).

There is need to investigate and understand the flow of sub-regional and regional construction manpower in union with supply and demand for construction and building services' skills as a prelude for developing a 'realistic model' which would accommodate in its' entirety the complexity and diversity of the construction and building services industry (Hillebrandt, 2003). Notwithstanding the labour intensive nature of the industry, manpower planning has been subjected to very little investigation (Uwakweh and Malony, 1991; Agapiou et al. 1995) and a variety of models have been used with more failure than success

(CITB, 1968 and 1988a; Briscoe et al., 1980; Briscoe, 1989; Briscoe and Wilson, 1993; Mackenzie et al., 2000 and Psacharopoulos, 2003).

2. CONSTRUCTION AND BUILDING SERVICES INDUSTRY IN THE UK

The UK's construction and building services industry is one of the strongest in the world with output ranked in the global top ten (DTI, 2004). The industry currently accounts for 10% of Gross Domestic Product (GDP) and employs 2 million people which is more than 1 in 14 of the total workforce (Anumba et al., 2004). Growth rate in the construction and building services sector in the UK has been outstanding (Figure 2.1). The total volume of construction output in the year for the second quarter of 2004 was up by 6% compared with the previous year (DTI, 2004). New work was up over the same period despite a slight decrease in repairs and maintenance works.

This buoyant outlook is reflected in employment trends in the last four years as illustrated in Figure 2.2. Manpower employment trend in the construction and building services industry was fairly stable between 1993 and 1998. Since 2000 manpower (employees and self-employed) has increasingly fluctuated between 1500 and 1650 thousands. With a slight decrease towards the end of 2003, manpower employment has started to increase and there is a prediction of further increase in 2004.

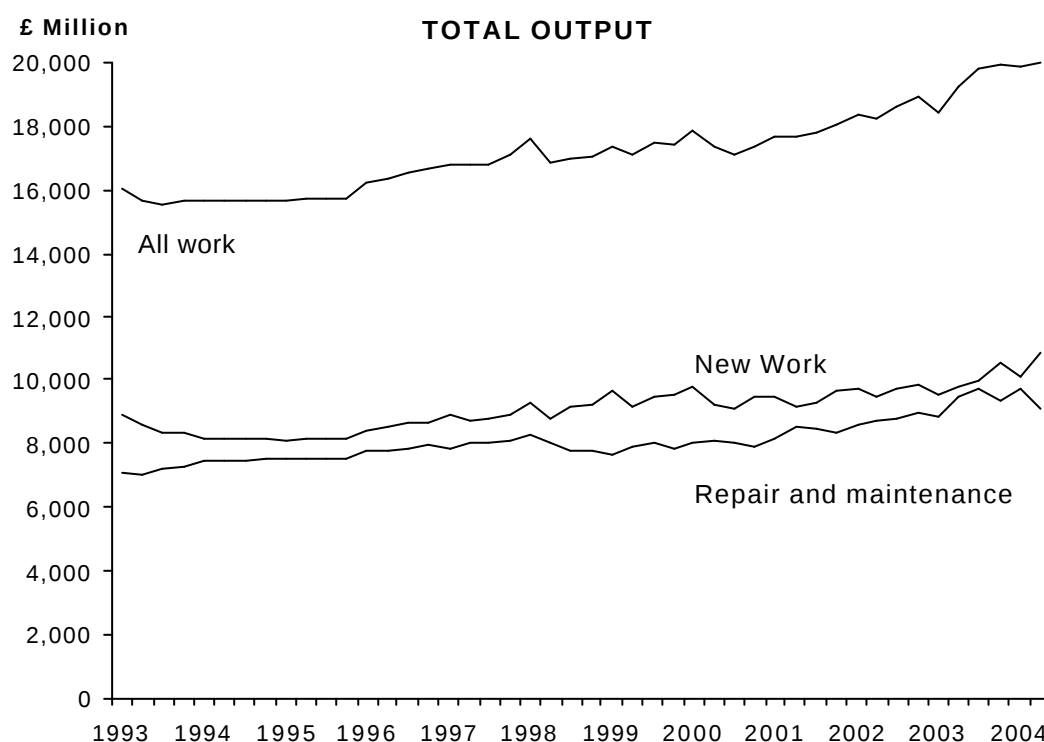


Fig. 2.1 Total construction output for Great Britain at constant 2000 prices seasonality adjusted

Source: Department of Trade and Industry (DTI)

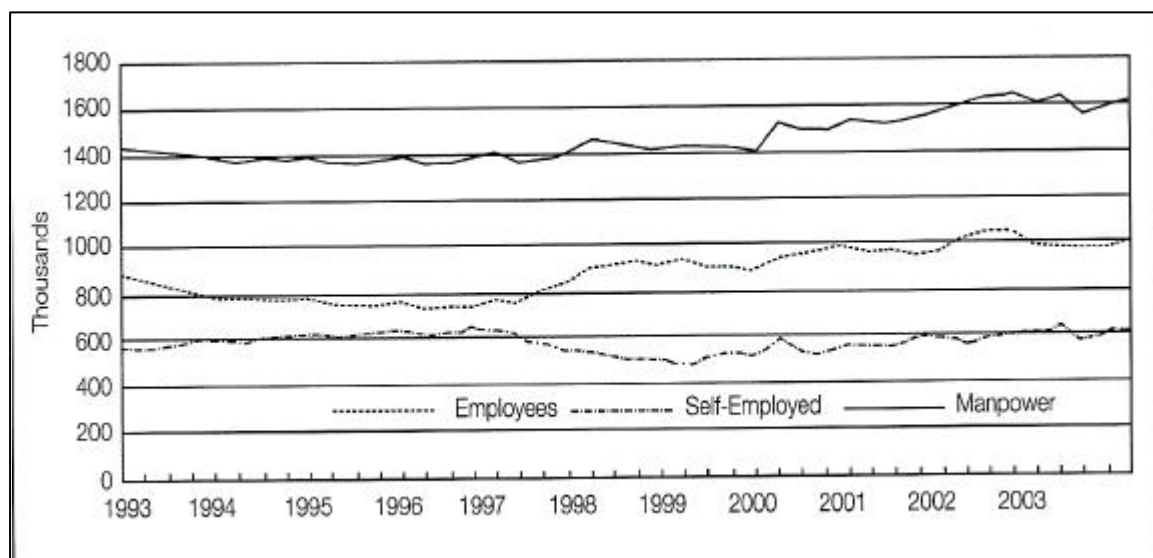


Fig. 2.2 DTI trends in employments and the professions
 Source: Construction Market Intelligence (DTI)

2.1 The Black Country

The Black Country, which is the focus of this study, is a constituent part of the UK. It is a sub region of West Midlands located to the north-east of Birmingham encompassing the four boroughs of Dudley, Sandwell, Walsall and Wolverhampton. In 2002, the West Midlands accounted for 8.1% of UK Gross Domestic Product and 8.8% of UK's labour force (CITB, 2003).

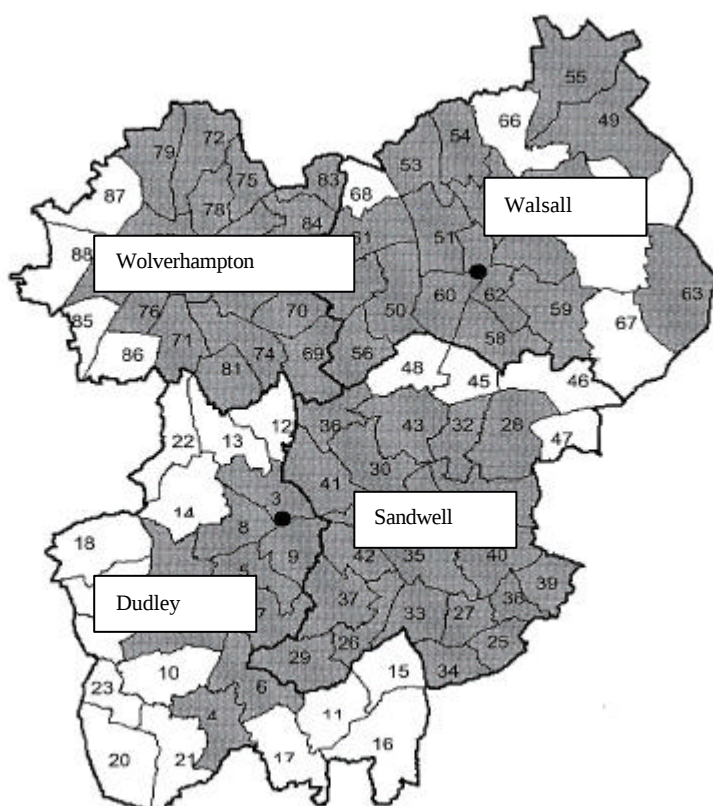


Fig. 2.3 Map showing the four boroughs that constitute the Black Country
 Source: Black Country Observatory

2.1.1 Peculiarities

In the Victorian era the Black Country sub-region was home to most of the workforces (skilled and unskilled) of the over 20,000 resident manufacturing companies. A decline in these manufacturing activities over time has left the sub-region's construction and building services labour market with high unemployment and claimant rate, skill mismatch, migration and immigration issues. Overall, unemployment is higher at 5.2% than the regional average of 3.9% or the UK average of 3.3% (ECOTEC, 2003; CITB, 2003). The Institute of Employment Research predicts that construction in the Black Country will decline at 0.6% per year compared with a national average of 0.1%; the proportion reliant on income support is 32% for the Black Country versus 27% for the West Midlands and 24% nationally.

The peculiarities of the construction and building services industry (Harvey and Ashworth, 1997p1-3; Hillebrandt, 1990; Hillebrandt, 1995; Koskela, 2000; Hillebrandt, 2003) is largely due to its' complex and diverse nature. In relation to construction and building services skills, it is evident from literature that the industry is currently experiencing skills mismatch. The skills mismatch cuts across all trades and it varies across the board nationally, regionally and sub-regionally. The severity of this mismatch will remain higher in regions where there is increased demand for construction and building services skills.

With the on-going and perceived future regeneration works, projected increase in output for the building repairs, maintenance and refurbishment sector, increased demands in the sub-region will likely lead to increased under capacity within the sub-regional construction labour market and potentially severe skills mismatch over the next few years. The implication of even the modest of the current industry growth forecasts is that there will be severe shortage of qualified new entrant trainees. This could create inflationary pressures within the construction market. Alternatively, Black Country firms (mainly SMEs) will have to draw from the 'informal' labour market to meet forecast demand if a realistic demand led model is not developed.

3. AIM OF THE PAPER

This paper is an on-going doctoral study entitled 'Modelling the supply and demand for construction and building services skills in the Black Country'. The aims and objectives of this investigation are:

- A literature review of construction manpower modelling
- A structured questionnaire survey to capture current and future supply of and demand for Black Country construction and building services skills
- To estimate the demand for construction and building services skills in the Black Country
- An empirical study of construction and building services activities in Black Country boroughs
- Development of conceptual model for simulating supply and demand of construction and building services skills using Unified Modelling Language (UML).
- Development of data capture framework for developing the model.
- Data analysis and model development
- Testing and validation of the model

A thorough review of previous reports and relevant literature, although becoming somewhat monotonous provides evidence of some consistency that the construction and building services industry is in a skills crisis which requires a more factual understanding of the issue and dynamics of the sector. This paper briefly discusses the peculiarities of the Black Country construction and building services industry as a prelude to presenting the research problems or questions it proposes to address, research methodology, variable identification and formulation of a demand led model for construction and building services industry.

4. METHODOLOGY

Overall, this research would implore the use of a deductive and inductive approach in addressing the research question's raised above by reviewing existing literature; conducting postal surveys of regional and national samples; structured interviews with industry stakeholders; empirical study of construction and building services activity in Black Country boroughs; quantify demand; variable identification and information gathering through workshops, multivariate data analysis and hypothesis testing using SPSS.

In developing a demand led model for the construction and building services industry, the research would adopt a forecasting methodology of demand for the labour force (Rosenfeld and Warszawski, 1993). The total labour man-hours required in each skill for the four boroughs of the Black Country sub-region will be obtained through equation 1.

$$L_j = \sum_{i=1}^m Q_i S_{ij} \text{ -----(1)}$$

Where:

- i = Index label for type of construction (total of m types).
- J = Index label for type of skill (total of n types)
- L_i = Required labour man-hours of each skill j.
- Q_i = Physical yearly quantity of construction type i.
- s_{ij} = Average or typical man-hours of skill j, required to produce one unit (e.g. square metre) of construction type i.

In turn, a realistic estimation of future labour supply would be derived from L_j (total labour man-hours) and structured questionnaire survey of Black Country training providers. The research will accept neo-classical theory of labour market mismatch as a framework for conceptualizing and developing a demand led model for sub-regional construction and building services industries. Net manpower will be determined through equation 2 (Uwakweh and Malony, 1991).

$$\text{Net Manpower} = \text{Demand} - \text{Supply} \text{ -----(2)}$$

Where: Net manpower is the difference between the demand and the supply of labour at any given point in time. When there is a shortage of labour, net manpower is positive and surplus of labour implies that net manpower is negative.

4.1 Key research questions:

- Given the dynamic nature of the construction labour market, where there is constant change in policy, no constraints on replacement demand, migration, age, nature, marriages etc., the fundamental question is whether we can really match supply of construction skills to its demand
- What are the primary causes of construction skills mismatch?
- What training needs are there so that the labour supply can be shaped to meet the demands of the Black Country economy?
- Is demand quantifiable in the Black Country construction and building services sector?
- Are there any frameworks in place for collecting and storing current and future supply and demand data / information in the construction and building services industry?
- Can a realistic model of construction supply and demand be developed?

4.2 Variable identification

Figure 4.1 below is a summation of both supply and demand variables as identified in the literature reviewed thus far. These variables seem to have varying effects in the stability (achieving a state of equilibrium) of Black Country's Construction and Building Services Labour Market. However, the applicability and testing of these variables for use in the development of a 'demand led' model would form part of our future works.

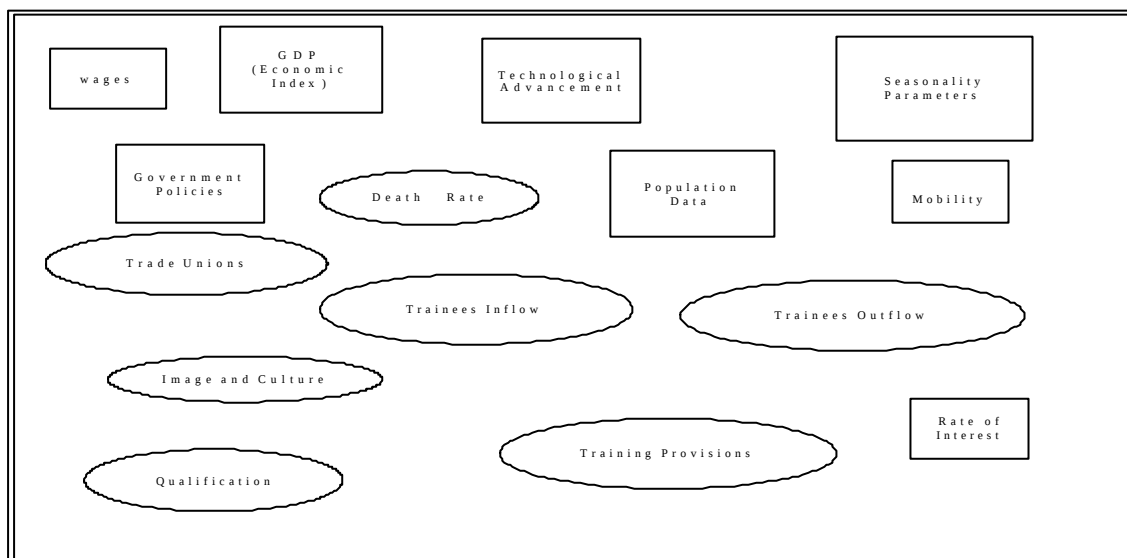


Fig. 4.1 Summary of variables influencing supply and demand of construction and building services skills

5. CONCLUSIONS AND RECOMENDATION

The construction and building services industry needs a realistic model, which should be able to optimise supply of, and demand for, construction and building services skills. The realism of achieving such an onerous task arguably lies on the identification of quantifiable and usable variables. Research in this area has the potential of contributing to the sustainability of the construction and building services sector. The next stage of this research will focus on quantifying demand variables. A data capture framework would be developed likewise an assessment of the construction and building services labour market, to identify demand for

construction skills, education and training of construction and building services stakeholders in the Black Country. A structured questionnaire survey to capture current and future supply of and demand for Black Country construction and building services skills and data analysis would be carried out as a prelude for developing a demand led model.

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