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Factor Analysis of the Market Environment for Artisanal Dimension Stone in Nairobi, Kenya

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Abstract: Artisanal dimension stone (i.e., blocks cut and shaped from natural rock using hand tools) has attracted scholarly attention as part of the informal sector of the construction industry and as part of the productive enterprise of artisans. One of the areas that intrigue scholars in this respect is the market environment of the subject product. In Nairobi, for instance, researchers have adopted a qualitative approach to the study of the market environment of artisanal dimension stone. We build on the outcomes of previous studies to present a quantitative approach to the factors influencing the market environment of artisanal dimension stone in Kenya by developing the factors identified in the past studies into 24 measurable variables that are then subjected to factor analysis to identify and gauge the principal components. The analysis identifies five principal components that influence the market environment: a difficult marketing terrain, a general lack of specification by building professionals and formal developers, occasional specification by building professionals, a cumbersome stone procurement system, and advantages provided by the use of artisanal dimension stone in building. These include both negative and positive factors, although the negative forces tend to dominate, resulting in an inhibitive rather than a facilitative environment. Recommendations are made to address this situation, including recommendations for an association with Communities and Small-Scale Mining (CASM) (a mining advocacy organisation) or similar institution and the formation of a marketing cooperative by the producing units to help in the formalisation of their transactions.

Keywords: Artisanal dimension stone, Factor analysis, Marketing, Nairobi

INTRODUCTION

Dimension stone refers to rock that has been cut and worked to a specific size or shape for use in building construction (Ashurst and Dimes, 1977). There are different types of dimension stone that may be used in the building envelope, including tiles for roofing, tiles or slab stone for floor finish, tiles (e.g., marble) for wall finish and blocks for stone masonry. The focus of this study is on stone masonry, also known as "cut stone" or "ashlar" (Hornsbostel, 1991). In this context, dimension stone takes the meaning attributed to it by Prentice (1990) as pieces of stone that have been cut into regular (three) dimensions and used for wall construction.

Shadmon (1989: 58) noted that there are two categories of tools used in extracting and working (manufacturing) dimension stone, i.e., hand tools or machine tools. Adopting the definition of artisanal materials by Wells and Wall (2003) as materials produced by individuals who use methods based on hand tools with simple division of labour and little capital equipment, artisanal dimension stone refers to materials produced using the first category of tools — building stones of regular dimensions that have been extracted and worked using hand tools as opposed to machine tools.

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According to Ofori (2000), the development of the construction industry is necessary for developing countries to fulfil their role of sustaining national economic and social development. Some areas that require research and development in this case include materials and the informal sector (Ofori, 2000). Therefore, research on artisanal dimension stone will contribute substantially to the development of the construction industry in Nairobi, Kenya in particular and the developing world in general.

Materials are the largest component of building construction unit costs (Kenya Building Research Centre, 2006). Hence, a study involving material marketing distribution and use is of great significance for the housing market in Nairobi. Nevertheless, the factors involved and the processes used in this study may also apply in the general contexts of artisanal mining and the market environment.

This study is arranged in five parts. The first part presents a review of the literature on dimension stone within the context of the research that has been conducted on the quarrying of artisanal dimension in Nairobi. The next two parts present the analysis technique and the methods of data generation. The last two parts present the analysis results and discussion.

ARTISANAL QUARRYING OF DIMENSION STONE IN NAIROBI

Quarrying is a form of mining distinguished by the fact that the product is intended for construction or architectural purposes, rather than for other human uses (Lahiri-Dutt, 2004). Artisanal dimension stone has been the subject of research in Kenya within studies initiated by the Intermediate Technology Development Group (ITDG) (see Wells, 2000). Wells (2000) is mainly concerned with the environmental impacts of artisanal stone mining in Nairobi, having undertaken research on the environmental impact of artisanal stone quarrying in Kenya. This research was funded by the UK Department for International Development through the ITDG, now known as Practical Action. Published in the *Small Enterprises Development* journal, the paper aptly situates quarrying of artisanal dimension stone in Nairobi in the context of small enterprises that contribute to employment creation and provision of basic goods at low cost (Wells, 2000). Although the paper makes some points about the business environment for the production of artisanal dimension stone in Nairobi, its main focus is on the ecological environment.

In a related paper, Wells and Wall (2003), consider artisanal materials in East African cities, specifically sawn timber in Dar es Salam and dimension stone in Nairobi. This study situates production of artisanal materials in the informal sector context or "the informal construction industry" (Wells, 2001; 2007). According to the paper, the production of artisanal dimension stone is greatly influenced by factors related to the liberalisation and eventual *informalisation* of the building industry. Liberalisation of the economy brought about the deregulation of cement prices, which led to a sharp increase in cement prices. The increase in cement prices led in turn to a rise in the cost of the main competing wall material, i.e., concrete blocks, of which cement is a significant component, thereby ceding part of its market to dimension stone.

Wells and Wall (2003) also contend that economic liberalisation led to a shift in building activities from the public to the private sector, especially to