



# Operations strategy, environmental uncertainty and performance: a path analytic model of industries in developing countries

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## Abstract

We extend the research of Ward et al. [Ward P, Duray R, Leong G, Sum C. Business environment, operations strategy and performance: an empirical study of Singapore manufacturers. *Journal of Operations Management* 1995;25: 99–115] to the business environment of developing industries by adding two neglected environment variables: ‘government laws and regulations’ and ‘political consideration’. We use a path analytic framework to study the effects of environment on the choice of operations strategy (low cost, quality, flexibility and delivery) and performance (self-reported change in profits) for a sample of United Arab Emirates manufacturers. We test the model suggested by Ward et al. and then test the extended model suggested for developing industries. For industries that are described as ‘small business’ and ‘developing’ rather than ‘mature’, we identify strong relationships between environmental factors such as labor availability, competitive hostility, government laws and regulations, political concerns and market dynamism and the operations strategy choices encompassed by competitive priorities. The data also indicates, that successful organizations (high performers), adopt competitive priorities that best fits the conditions of the environment, notably stability and dynamism. Results show that most firms accept their environment as given and install the mechanism to react to its forces. High performers match the complexity of their external environment by utilizing environmental variables as sources for effective controls within their organizations. © 2000 Elsevier Science Ltd. All rights reserved.

*Keywords:* Developing countries; Operations strategy; Performance; Path analysis; Structural equations

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## 1. Introduction

Many authors have represented and studied the content of manufacturing operations strategies [1–6]. The

link between operations strategy and business performance has long been asserted in conceptual work in operations [2]. All too often, production strategies reflect incorrect assumptions about the environment. This lack of understanding of the environment can waste a firm’s resources for years. Many authors have elaborated on the relative neglect of environmental factors in operations strategy research [7–9]. However, empirical evidence of the existence and nature of this link

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has emerged in which environmental forces are explicitly defined [9–13].

The external business environment in which a firm competes changes continually, so an organization needs to adapt to that environment continually [14,15]. A crucial reason for environmental scanning is to stay ahead of competition. Competitors may be gaining an edge by broadening product lines, improving quality, or lowering costs. New entrants into the market or competitors who offer substitutes for the firm's product may threaten continued profitability [16,17].

Krajewski and Ritzman [18, pp. 14–15] identify other important environmental concerns to include economic trends, technological changes, political conditions, social changes, the availability of vital resources and the collective powers of customers and suppliers. As a result, many researchers note that environmental changes may cause a company to reconsider its current strategies [19–22,23, pp. 8–9,24]. Heizer and Render [25, pp. 26–27] define environmental variables to include: economic, cultural, technological, demographic and political-legal. Stonebraker and Leong [26, pp. 561–566] provide a definition for an 'environmental field of action' or an area in which the organization is committed. It includes the definition of products/services, process technology, markets and the mechanism to interface with the external environment. Further, they point out that strategy provides the critical intermediate link between the organization design of the operations function and the dimensions of environment.

Bourgeois [27] points out that firms need to focus on the external environment: customers, competitors, suppliers and regulatory agencies; on the attributes of external forces: complexity, dynamism and munificence; and on the managerial perceptions about these environmental attributes. Swamidass and Newell [10] establish the importance of the business environment as a significant causal element in the operations strategy — business performance nexus. It is only reasonable to project that environment should be presented as a major key that when integrated with effective operations strategy would be pivotal to the performance of the organization.

We build on the findings of Ward et al. [13], Swamidass and Newell [10] and Williams et al. [28]. We extend their works by incorporating consideration of environmental factors in research on operations by considering such environmental attributes as government laws and regulations and political considerations. The present study is distinguished from the similar work of Ward et al. [13] and Williams et al. [28] in several ways. First, the firms in the survey (in terms of assets or employee size) would constitute small manufacturing firms in the US or Western Europe; second, the sample is drawn from an environment that is developing (the

geographic locale is different); third, the sample is broader in industry coverage and larger in size; fourth, environmental concerns are expanded to six dimensions rather than four, as this covers content somewhat more completely; and fifth, covariance structure modeling is used to estimate the path model along with other statistical procedures.

The main contribution of the paper is from the discussion of the environmental factors and its linkage with operations strategy in the UAE, a developing country. The study employs structural equation modeling techniques to provide recent evidence of the links between operations strategy, environment and performance and to describe the nature of these relationships.

The United Arab Emirates provides a particularly interesting setting for this study because of its location in the Middle East. Recently, the UAE has experienced high levels of economic growth that have resulted in environmental pressures such as perceived business costs and shortages of skilled and unskilled labor [29]. While oil related manufacturing represents 33.7% of the UAE gross domestic product (GDP), nonoil related manufacturing represents about 8.2% of the UAE gross domestic product. The contribution of the nonoil related sector in the GDP has increased from 11.2 billion Dirhams in 1994 to 11.8 billion in 1995. Furthermore, the UAE government claims that manufacturing is the future cornerstone of its economy. The UAE's position as an emerging economic and manufacturing leader in the Middle East and the relative neglect of the region in operations literature make it an important new voice to be heard.

## 2. Environmental concerns, production strategies and performance: background

Recently, empirical evidence of the existence and nature of the link between the environment, production strategies and performance has emerged [30–33]. Empirical studies in operations strategy have sometimes dealt with environmental factors indirectly by focusing on a single industry rather than covering a wide spectrum of industries (Tan and Litschert [24] focus on the electronic industry; Schroeder and Mavando [22] on the food processing industry; and Vickery et al. [11] on the furniture industry. Researchers in many studies have pointed out that because industry and environment are inextricably linked, limiting a study to a single industry also limits the environmental variation in the sample [34–36]. In a multiple industry study of operations strategy, Miller and Roth [4] acknowledge they are unable to explicitly control

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