

# The Attractiveness-Competitiveness Matrix: A Methodology Used to Assist Policy Makers Select Priorities for Industrial Development Initiatives

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## Abstract

This paper contributes to industrial development methodology by advancing a simple matrix – The Attractiveness-Competitiveness matrix -- that can be used to assist policy makers to determine what priorities should be placed on developing different sectors of their economies.

It presents the matrix, illustrates how it was used to help the Polish government set priorities for which subsectors (Strategic Industry Units or SIUs) of the packaging industry it should support after the government had already decided to place a high priority on developing the packaging relative to other industry sectors. It categorizes and summarizes industrial policy initiatives and how they were determined. It also explores some of the government policies and programs that were suggested to support industry SIUs adjudged to be attractive, but that were not competitive yet could be made to become so.

**Keywords:** Industrial development methodology, Public sector strategy methodology

## 1. Introduction

When industry efforts to plan for the future evolved from simple budgeting and forecasting to strategic planning, many private firms drew from the planning approaches, tools and techniques used by military organizations that were far advanced in the planning field. Today, both the military and private sectors use many common tools and techniques: SWOT analysis (Grant, 2008) and the Balanced Score Card (Kaplan and Norton, 1996) to name just two. Yet, some approaches are very distinctive to each sector. For example, the Boston Consulting Group's Growth- Share matrix ( Boston Consulting Group cited by Johnson, Scholes and Whittington, 2008), a business portfolio planning tool, has little use in the public sector; negative cash flow analysis to help supplier selection in large military projects has little use in the private sector.

The non-military public sector has yet to develop a detailed set of planning methodologies and specific approaches that meet its unique needs (Aulich, Halligan and Nutley, 2001; Hughes, 2008). This paper contributes to such methodologies by advancing a simple matrix, the Attractiveness-Competitiveness matrix that can be used to assist governments to address the key question of what priorities should be placed on developing different sectors and subsectors (Strategic Industry Units or SIUs) of their economies. The matrix was first conceptualized and used in a year-long management consulting project undertaken by industrial development consultants who were retained by the Polish Ministry of Industry and Trade and the Ministry of Ownership Change to assist these ministries to help the Polish economy to transition from being command to market driven. More particularly, the consultants formulated a development strategy for the packaging industry, an industry adjudged to be important to Poland's economic future and amenable to support after it was compared to other industry sectors.

The Attractiveness-Competitiveness matrix constituted a core strategic planning tool. Like the McKinsey (Directional Policy) Market Attractiveness-Business Strength matrix (McKinsey and Company cited by Johnson, Scholes and Wittington, 2008) and the Arthur D. Little Strategic Position matrix (Arthur D Little, Inc., ud) used in corporate and strategic business unit planning, it has two axes Attractiveness (horizontal) and Competitiveness (vertical).

For the Polish packaging industry, attractiveness was defined as the extent to which one of its 39 Strategic Industry Units (SIUs) was important to the development of the economy by having the potential for its output to substitute for imports or contribute to export sales itself or, similarly, help its industrial customers; and, the

extent to which it was likely to experience growth. (Should the matrix be used in other industry contexts, the criteria used to define the horizontal or vertical axes may be adjusted to reflect government policy for and the inherent characteristics of these industries).

SIUs are plotted on the matrix depending on their performance on the two dimensions. Different zones of the matrix suggest which SIUs should be given priority for development and support by policy makers. Some, for example, may be attractive and competitive and may not need any government support; others may lack competitiveness and attractiveness and the government (and country) may not benefit from supporting them.

For those SIUs for which support is justified, the government could engage in a number of initiatives, for example, encouraging inward investment in the SIU, or providing international marketing expertise so that its products or services are professionally promoted in foreign markets.

The paper presents the matrix, illustrates how it was used to help the Polish government set priorities for which packaging industry SIUs it should support with industrial policy initiatives and how they were determined. It also explores some of the government policies and programs that were suggested to support SIUs adjudged to be attractive, were not competitive yet could be made to become so.

Note that starting point for the analysis was a dictate that the packaging industry was highly important to Poland. Hence the units of analysis were defined as SIUs (see below). However, the matrix could have been used to select more general priorities by, for example, defining industries as the units of analysis.

The paper is in nine parts. The first introduces the topic. The second part comments on the research approach used to develop the methodology; the third part describes how the units of analysis (SIUs) were selected. The fourth describes the matrix and how it was used to set priorities for packaging industry SIU policy support. The fifth part describes a selection of strategies that were recommended for one subsector (consisting of two SIUs): long run bottles and jars to illustrate in more detail how the matrix was operationalized. The sixth and seventh parts briefly comment on policy and program recommendations for the packaging industry as a whole. While these do not relate directly to the use of the matrix they were thought by the author to be of general interest to readers. The paper concludes with a description of the contributions the methodology makes to academia and practice and its limitations

## **2. Starting Hypotheses and Approach to Research**

The fundamental hypothesis underlying the research was that subsectors (SIUs) of an industry can be analyzed and that sensible priorities for offering government support to them can be determined using a strategic planning methodology or “tool”. The methodology that was used to test this hypothesis is described in detail below in Section 4 and illustrated in Section 5. It was developed by management consultants in a year-long program of action research. During the program, a team, varying from five to 16 consultants, worked on-site with representatives of the ministries sponsoring the research and senior managers in a broad selection of SIUs representing each of the packaging material families (metal, glass, plastic, paper, etc.). This approach was used because it was believed by the consultants that only by visiting plants, reviewing cost accounts, quality control records and otherwise accessing primary data could the analyses be undertaken, and the methodology employed, with sufficient degrees of validity and reliability to support the conclusions and recommendations made to the ministries, many of which were not intuitively obvious.

## **3. Defining the Units of Analysis**

Strategic Industry Units, or SIUs, were the units of analysis. They are comparable in many respects to Strategic Business Units (SBUs) that are used in corporate strategic planning systems.

An SIU is a product or product line for which strategies may be developed independently of other products and product lines. The following criteria were used to determine whether a product (or line) constituted a separate packaging industry SIU:

- Customers: Were the products destined for the same group of industrial end-users as other industry products or lines?
- Competitors: Were the products produced by a different set of competitors than other products or lines in the industry?
- Substitutability: Could the products be substituted by another product or product line produced by the industry?
- Price and quality dependence: Would changes in price or quality in one product or line be likely to affect the prospects of another product or product line?

- Linkages: Would increasing or decreasing the scale of production of a particular product line have an impact on the sales effectiveness or production costs of another product or line in the industry?

In the work that was done for Poland, it was determined that the packaging industry consisted of 39 separate SIUs. That is, priorities to determine government development support could be (and were) set for 39 different products or products lines independently of one another.

#### 4. Setting Development Priorities

Recommendations for priorities the government should set to provide support to different SIUs were based on the matrix that appears in Figure 1.

Figure 1: Matrix to Set Priorities for Government Support

#### (INSERT Figure 1)

The following factors were used to determine where an SIU was plotted on the matrix:

- Attractiveness was assessed by taking account of:
  - The strategic importance of the SIU. This, in turn, was determined by considering:
    - Its ability to help end-users either take share from imports of export packed products; or,
    - The ability of the package manufacturer itself to export directly or substitute its output for imports;
  - The expected growth of the SIU.
- The competitiveness of the SIU which was assessed by considering:
  - The cost structure of the SIU compared to Western standards;
  - The quality of its output versus Western standards of design and package integrity and consistency of production runs to meet customer standards and tolerances.

Following analysis of the SIUs it was determined, that eight\* ones were attractive, not competitive but could become competitive. It was therefore recommended that high priority be placed on their development (See Figure 2).

Figure 2: High Priority SIUs

#### (INSERT FIGURE 2)

The analysis suggested that medium priority should be placed on five SIUs. These are shown in Figure 3.

Figure 3: Medium Priority SIUs

#### (INSERT FIGURE 3)

In addition, four SIUs which were in the process of being established needed no government support. Finally, it was recommended that low priority be placed on three uncompetitive and unattractive SIUs. These are shown in Figure 4.

Figure 4: Low priority SIUs

#### (INSERT FIGURE 4)

#### 5. Formulating Strategic Recommendations for the Long Run Glass SIUs

SIU strategy recommendations focused on the medium and high priority SIUs in each material family (glass, paper, plastics, etc.) as shown in Figure 5.

Figure 5: Focus for Strategy Development

#### (INSERT FIGURE 5)

##### 5.1 Rationale for the Priority Placed on Long Run Bottles and Jars

Long run glass provides an example of how the matrix was operationalized. This sub-sector consisted of two SIUs, one manufacturing and marketing long run bottles, the other long run jars. These SIUs, in turn, were comprised of three state owned enterprises (SOEs) and a number of smaller co-operatives. After the analysis, both SIUs were plotted in the lower left hand portion of the Attractiveness-Competitiveness matrix (See Figure 2).

These SIUs were attractive and could be made competitive.

#### 5.1.1 Strategic Importance

These SIUs were strategically important to Poland. Some plants were exporting 30-50% of their volume to Western European markets. While volume was forecast to decline marginally it was expected to stabilize as shown in Figure 6.

Figure 6: Volume Forecast for Long Run Bottles and Jars

**(INSERT FIGURE 6)**

#### 5.1.2 Competitiveness

Quality of output was generally lower than in Western markets, but it was thought that some plants could improve it fairly easily.

The quality problems were related to both equipment and labor practices. In the order of 50% of the equipment needed modernization: batch houses had composition problems; furnaces had temperature problems and forming lines had weight, tolerance, speed and mould problems. Labor practices related to quality control were less rigorous than in the West. There were needs for training and operational know-how and a general improvement of working environments at the plant level. One glass mill, the largest, had modern equipment yet the quality of its output was little better than the other mills. It was believed that the mill had high potential to improve its quality with little effort.

Parts of the SIUs were cost competitive but the difference between enterprises was significant. Figure 7 shows a comparison of Western and Polish costs for long run bottles.

Figure 7: Cost Comparison of Western and Polish Long Range Bottles

**(INSERT FIGURE 7)**

#### 5.2 Recommended Strategies for Long Run Bottles and Jars

Two observations underpinned the strategy recommendations. First, performance of the SIUs was suboptimal for structural reasons; second, a major investment was required to satisfy demand with competitive equipment (i.e. equipment that would reduce costs and improve quality). Structural problems resulted from the large number of enterprises in these SIUs: 15 versus between two and four in Western countries of comparable size. As a consequence, modern equipment was spread among the enterprises which had been equipped on an ad hoc basis. And, operationally, Polish firms did not dedicate forming lines to particular customers and runs leading to excess down time for customer or size switch-overs so that economies of scale were not achieved.

In order to meet demand with competitive equipment, investment requirements for the SIUs were estimated at about \$100m over five years. Demand is shown in Figure 8.

Figure 8: Long Run Bottles and Jars Demand Forecast in Light of Capacity Adjustments

**(INSERT FIGURE 8)**

Given the importance of these SIUs, their potential to become competitive and their overall condition, three main strategic recommendations were made for the State Owned Enterprises (SOEs) and cooperatives that operated the SIUs' plants:

- The competitive SOE should be sold (partially or wholly) to a foreign investor;
- The remaining SOEs should be liquidated to re-group their assets in order to create at least one additional company;
- Co-operatives should be closed.

The largest and most modern SOE was thought to be a good candidate for sale because it had modern plant but suffered from poor management, operations and technology. These resulted in a high product rejection rate (20%), and high overheads, among other problems. Licensing-in technology and inviting in Western managers under contract could have solved some problems but a foreign investor could have helped the SOE by providing the capital the SOE required (\$16m over three years) and giving access to critical technologies in such areas as light weighting.

The liquidation of the other SOEs and regrouping of assets were recommended to form a new competitive SOE. This was to be accomplished after a more in-depth manufacturing audit than that undertaken by the consultants to determine the viability of individual pieces of equipment and lines and then transferring the most modern to a

single location. It was also recommended that the Polish government seek a foreign partner to assist it to implement these tasks.

It was recommended that the cooperatives close for three main reasons. First, they were very small, typically with outputs of less than 100m units (the minimum economic size for a long run glass SIU was 500m units); second, they were equipped with worn out machinery from larger mills; third, they were set up as a 'convenience' to avoid out-of-stocks by customers under the former political regime and they were no longer necessary in the new market-led economy.

Other specific actions were recommended for the government to support these SIUs. For example, their energy use was excessive. With government help, a recycling system for glass cullet to use in the glass furnaces could have reduced energy costs. In addition, the SIUs were taking a reactive approach to exports. Assistance with setting up agency networks and the creation of an export data base (including foreign customer's product specifications, volumes, etc.) were also recommended.

## **6. Government Policy Support to the Packaging Industry**

With the policy framework in place at the time, many traditional industrial policy tools were unlikely to be used. The government's overriding macro-economic policy objectives were to balance the budget, control credit and control inflation. The overriding government policy was to reduce involvement of the state in economic affairs. Thus, input factor subsidies and some other traditional tools were not recommended. However, it was believed that some government initiatives could be undertaken without introducing significant distortions into the economy. These included lobbying for foreign companies to be given tax holidays for investment in medium-high priority SIUs under a Foreign Investment law, focusing the provision of bank guarantees by the Ministry of Finance to medium and high priority SIUs, lobbying the Ministry of Foreign Economic Relations to modulate tariffs in selected SIUs (folding cartons, aseptic cartons, gable top containers, metal cans, all of which were in the start-up mode), and ensuring end-user representation on new standard setting committees.

In addition, it was recommended that legal mechanisms be introduced to enable the regrouping of industrial assets, that environmental policies be developed that initially focused on plant operations (rather than on products) and that ISO type standards be established with a supporting organization.

## **7. Government Program Support to the Packing Industry**

It was recommended that the government engage in six industry-wide programs to help the industry to implement the proposed strategies of the SIUs:

- Train packaging industry personnel;
- Recruit contract support to management;
- Introduce a user education program;
- Encourage inward investment and technology transfer;
- Establish a packaging advisory service;
- Set up a design council.

Each of these had specified objectives, a 'thumb nail' sketch of key elements of the program and are commendation for which government agency(ies) should assume responsibility for it, The encouragement of foreign investment and technology transfer serves as an example:

*Objective:* To provide sector specific arrangements to Western firms to invest in key areas of the Polish packaging industry.

*Key Elements of the Program:*

1. Selectively deepen the analysis of market opportunities in packaging in Poland;
2. Build consistent up-to-date database of Polish packaging companies;
3. Publicize opportunities at industry trade shows (e.g. Pakex) through industry publications and direct contacts;
4. Disseminate to interested parties an analysis of opportunities and consistent package on "how to do business in Poland."

*Who:* Task force consisting of Cobro (the Polish packaging industry association), the Ministry of Foreign Economic Relations and the Ministry of Privatization.

## 8. Contributions

Strategic planning methodologies and tools are well developed in the private sector.

The public sector has made a significant effort to adapt them for its own use since the proliferation of public sector strategic management approaches in the early 1980s (Hughes, 2008). While some private sector methodologies have been used successfully in the public sector, for example, the Balanced Score Card (Kaplan and Norton, 1996), the requirement for task-specific analytic approaches and tools that are unique to the public sector and that can be used in macroeconomic decision processes is manifest. (Aulich et al., 2001). Indeed. There are a plethora of tools used, for example, by development banks and governments to select individual projects to support (Meyer, 2008). These often apply financial hurdle rates to projects as they are advanced to decision makers for approval (Bhatt, 1977). While these are useful to make yes-no decisions at the microeconomic level, they are not helpful to select a course of action, such as those involving resource allocation, from multiple alternatives at the macroeconomic level.

At the macroeconomic level much data are available and many expert opinions advanced about myriad development issues (Rosenberg, 1983). These include, among others:

- What sector and subsector (SIU) performance is likely to be in the future and, implicitly therefore, which industries might need support (Gallup Poll News Service, 2010; Schneiderman, 2004; Asia Monitor, 2005; Yoder, 2007?)
- What specific problems that cross industry and subsector (SIU) boundaries could be resolved by government intervention ( National Commission on Productivity, 1972; Economist, Aug., 2009)
- In which sectors and SIUs is a government seeking inward investment or which for other reasons represent the best opportunities (Yoder, 2007; Roussel, 1993)?

The data and opinions on such issues may provide insights into what sectors and SIUs are attractive for development and which could benefit from government support but they do not provide a mechanism or tool that allows specific inter-SIU (or sector) comparisons on a level playing field.

The Attractiveness-Competitiveness matrix facilitates such comparisons. It may be used to help government agencies concerned with industrial policy to set priorities for sectors and sub-sectors (strategic industry units) to which they should lend or withhold support. And, it provides a methodological framework for academics interested in industrial development choices. Essentially, it consists of a vehicle for theoreticians or practitioners to link government economic objectives like import substitution through the analysis of an SIU's performance on criteria that are used to set priorities for support. Equally important the matrix takes into account whether an SIU actually needs support or would likely become competitive without it.

## 9. Limitations

The matrix was first used in Poland, to help the Polish government set priorities for 39 SIUs that constituted the country's packaging industry. It was also suggested in Section 1 that it could be used to set priorities at the industry (versus subsector) levels. That is, multiple industries could be evaluated simultaneously or, indeed, all of the industries in an economy. Were it to be used for such a purpose, the criteria for assessing industries' attractiveness and competitiveness would no doubt be different for different industries. For example, the potential for import substitution might be more relevant to some industries than the potential to attract inward investment or needed technologies, two other possible evaluation criteria.

In cases where there are significant differences in what constitutes attractiveness and competitiveness by industry, a means of ranking the relative importance of criteria used to assess the industries is needed. Only by taking into account such rankings can policy makers ensure that conclusions and recommendations about which sectors should have government support are linked more broadly to industrial development objectives.

## References

"Industry sector drives growth," *Asia Monitor* (Jan., 2005) Vol. 16, Issue 1, p. 5.

Arthur D. Little, Inc., undated, Cambridge, Ma.

Aulich, C., Halligan, J., and Nutley, S. (2001). *Australian handbook of public sector management*. Crows Nest, NSW, Australia: Allen and Unwin.

Bhatt, V.V. (1977). On a development bank's selection criteria for industrial projects. *Economic Development and Cultural Change*, Vol. 25, No. 4, pp. 639-655.

Boston Consulting Group, New York cited by Johnson, G., Scholes, K., Whittington, R. (2008) in *Exploring corporate strategy*. (8<sup>th</sup> ed.). Harlow, Essex, UK: Pearson Education Ltd. pp. 278-280.

Editorial. (Aug., 2009). Unbalanced Germany. *The Economist*, Vol. 392, Issue 8643. p. 10.

Gallop Poll News Service. (2010). Annual update: Americans rate business and industry sectors. Washington, D.C: USA, [Online] Available: <http://www.galloppoll.com/content/ci=18130>.

Grant, R.M. (2008). *Contemporary strategy analysis*. (6<sup>th</sup> ed.). Malden, Ma., USA: Blackwell Publishing, pp. 12-13.

Hughes, O. (2003). *Public management and administration*. (3<sup>rd</sup> ed.). Houndsmill, Hampshire, UK: Palgrave Macmillan.

Kaplan, R.S., & Norton, D.P. (1996). *The balanced score card*. Cambridge, Ma., USA: Harvard Business Press.

McKinsey and Company, New York, New York cited in Johnson, G. Scholes, K., Whittington, R. (2008). *Exploring corporate strategy*. (8<sup>th</sup> ed.). Harlow, Essex, UK: Pearson Education Ltd. p.281.

Meyer, W. (2008). The effect of earned value on the present worth of a project. *Cost Engineering*, Vol. 50, Issue 11, pp. 8-19.

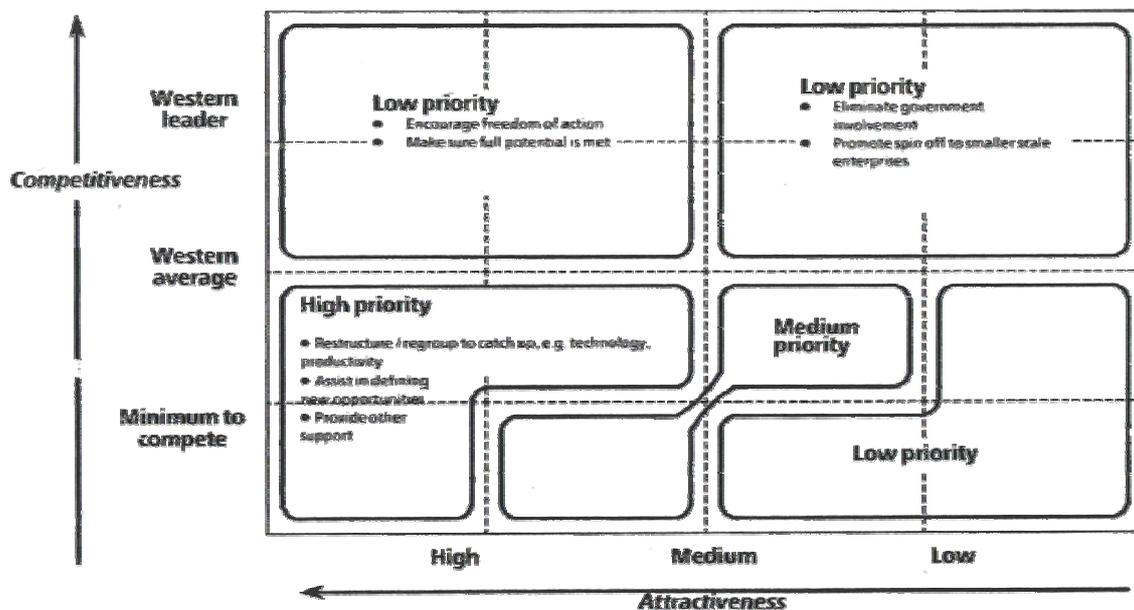
National Commission on Productivity (March, 1972). *First annual report*. Washington, D.C., USA: US Government Printing Office.

Rosenberg, R.D. (1983). Business and national priorities for industrial development: Intersectoral consensus. *Strategic Management Journal*, Vol. 4, Issue 1 pp. 67-78.

Rousell, P. (1993). The seven best industries for foreign investors. *Site Selection and Industrial Development*, Vol. 38, Issue 2, pp. 454-457.

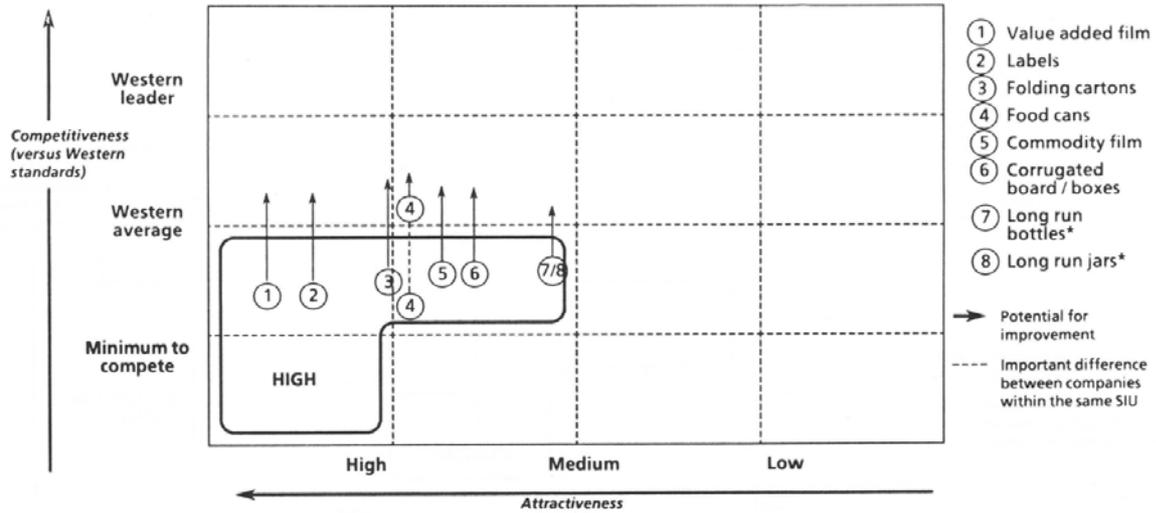
Schneiderman, R. (2004). The pulse of our industry. *Electronic Design*, Vol. 52, Issue 13, pp. 27-32.

Yoder, L. (2007). Italy's ICT Industry Sector: Attracting Global Investment. *Expansion Management*, Oct., Vol.22, No. 5 p.54.



Source: Arthur D. Little, Inc.

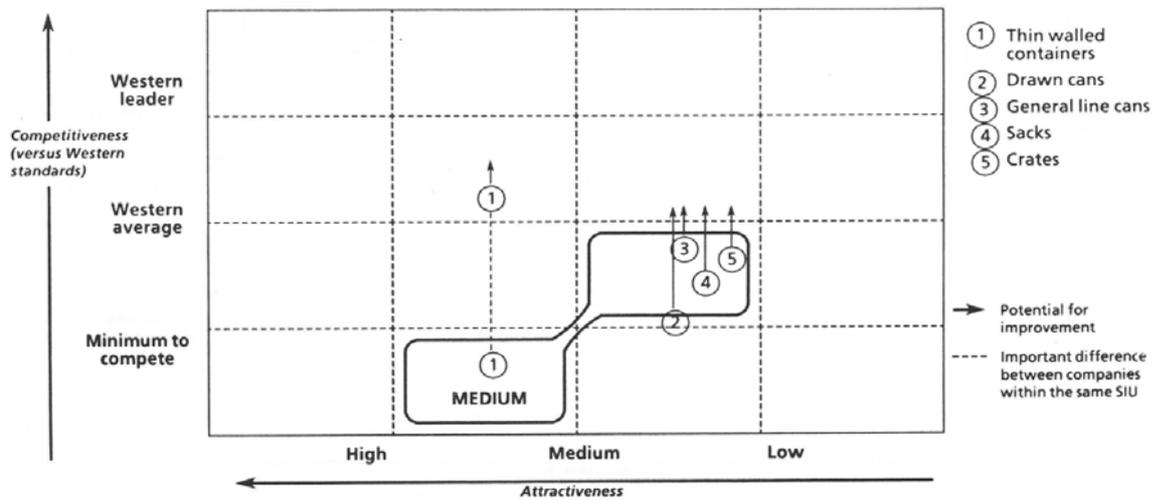
Figure 1. Matrix to Set Priorities for Government Support



Source: Arthur D. Little, Inc.

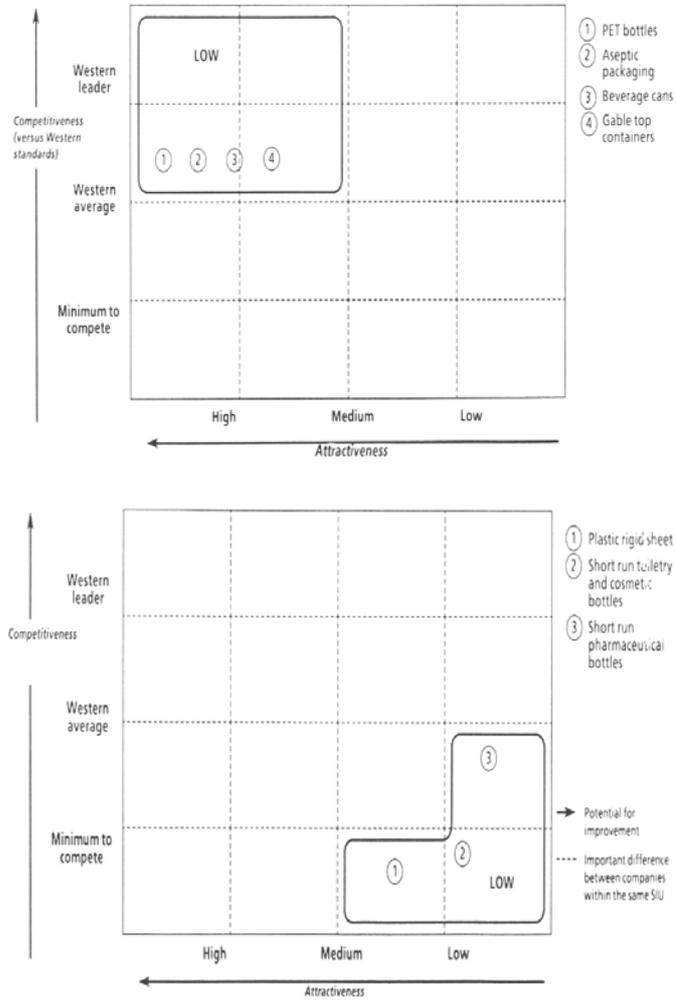
\*Other SIUs were analyzed but the results do not appear in Figures 1-4 to simplify presentation of results

Figure 2. High Priority SIUs



Source: Arthur D. Little, Inc.

Figure 3. Medium Priority SIUs



Source: Arthur. D. Little, Inc.

Figure 4. Low priority SIUs

	<i>Major thrust of SIU strategies</i>	<i>Potential relative investment requirement*</i>
<b>Paper</b>	<ul style="list-style-type: none"> <li>● Privatised (part within packaging, part within pulp / paper)</li> <li>● Encourage new investment</li> <li>● Upgrade at company level</li> </ul>	Low
<b>Glass</b>	<ul style="list-style-type: none"> <li>● Regroup / restructure high priority SIUs</li> <li>● Attract foreign partners</li> <li>● Privatised</li> </ul>	Very substantial (>100\$m)
<b>Metal</b>	<ul style="list-style-type: none"> <li>● Regroup / restructure high priority SIUs</li> <li>● Attract foreign partners</li> <li>● Privatised</li> </ul>	Very substantial (>100\$m)
<b>Plastic</b>	<ul style="list-style-type: none"> <li>● Selective restructuring</li> <li>● Privatised</li> <li>● Encourage new investment</li> <li>● Upgrade at company level</li> </ul>	Low

\* to restructure / regroup

Source: Arthur D. Little, Inc.

Figure 5. Focus for Strategy Development

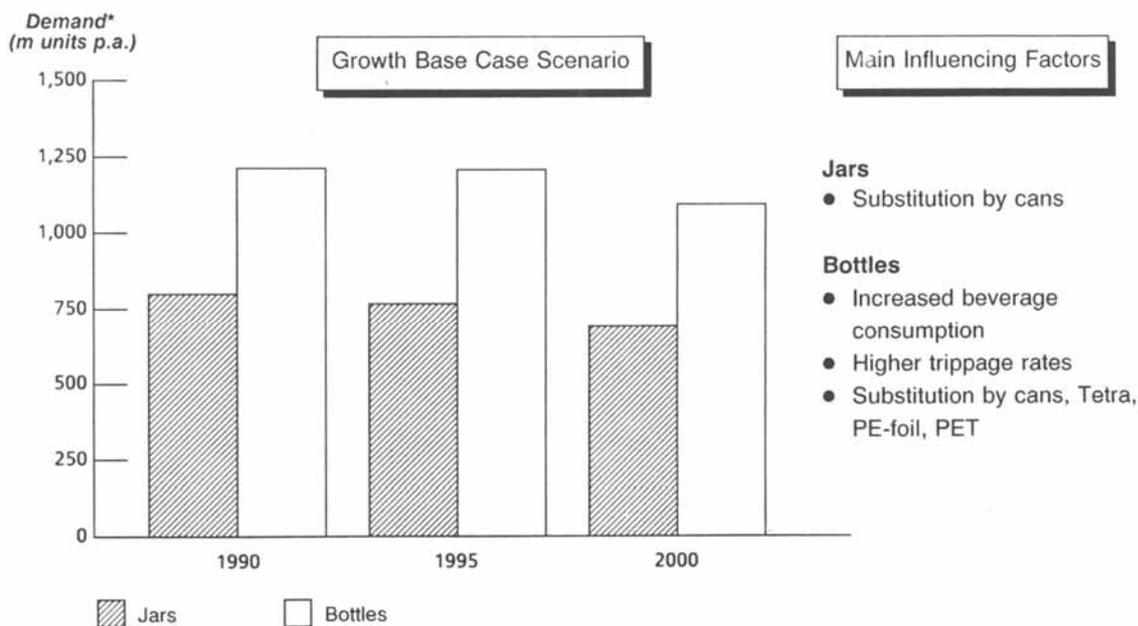
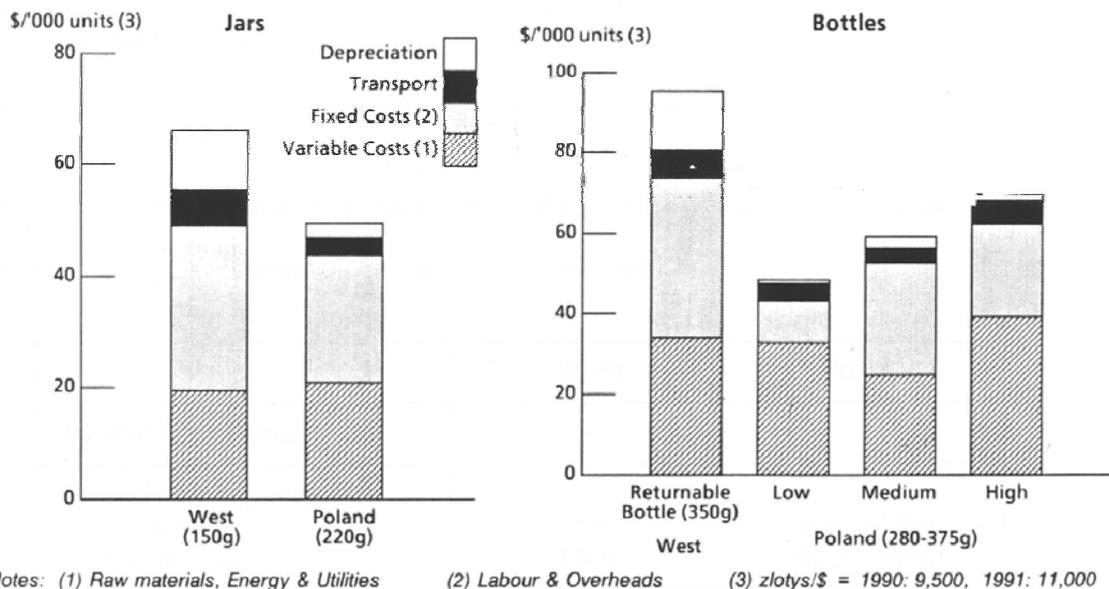
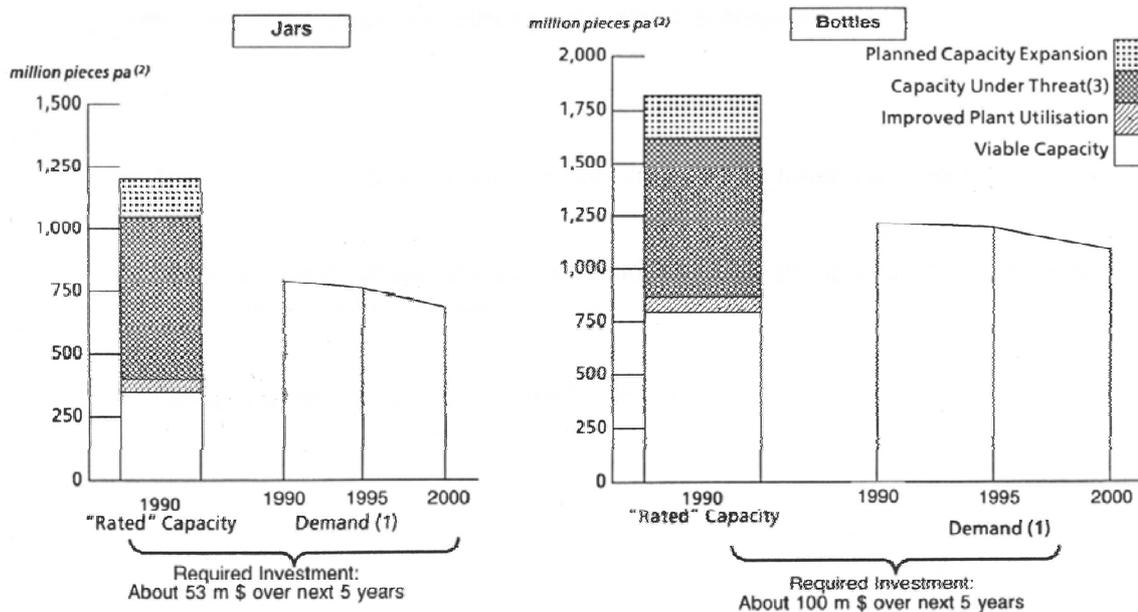


Figure 6. Volume Forecast for Long Run Bottles and Jars



Source: Arthur D. Little, Inc.

Figure 7. Cost Comparison of Western and Polish Long Range Bottles



Source: Arthur D. Little, Inc.

Figure 8. Long Run Bottles and Jars Demand Forecast in Light of Capacity Adjustments