

Integrated Planning Systems: A Prospectus¹

Objective

Integrated planning systems are dynamic forecasting tools developed to gather, analyze and continuously update corporate short, medium and long-term sales data by markets and product-lines. Systems are designed to provide senior staff with analyses of market potential based on a marriage of internal sales information with external economic data drawn from industry specific databases.² A fully functioning IPS links business unit sales with external market data on a regular schedule. Planning becomes a continuous process.

Structure

An IPS integrates information from two sources:

1. **internal corporate-wide sales data** drawn from financial information systems (or ERP systems) at a product, market, and purchasing industry-level of detail.
2. **external economic data** drawn from more detailed global industrial, employment, trade and macroeconomic databases.

While no two systems are the same, there is a generalized approach to the development of these systems that begins with the corporation, in cooperation with the consultant, to determine:

1. the product detail needed to meet management goals – product aggregates should reflect company requirements balanced against accuracy (less aggregated data tends to be less accurate).
2. the geographic focus of the company – typically an IPS is at a country level of detail (or, in the case of the United States, where more detailed regional data is available, at the State level).
3. the end-markets served (sales to other companies by industry group, to final consumers possibly by type of retail or wholesale establishment).

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² IPS's may be limited to national data, regional data, or cover global economic data.

Not all of these dimensions will be needed; in many cases company data is incomplete and not structured along all dimensions. A pooled-cross-sectional-time-series model that links geography, product and end-market served is an ideal approach to these multi-dimensional problems.

External Data Sources³

An IPS is feasible today because there exists a robust, consistent, set of global, industrial and service sector sizing data that can be used to evaluate market potential. Macroeconomic data is insufficiently detailed to be a useful guide for modeling company sales by product-line; and international trade data is no substitute when assessing market size at a product specific level of detail. Industrial sizing information covering market demand, industrial and service sector production, employment, personal consumption spending and business fixed investment is available for more than 70 countries, rich and poor alike.⁴

Production data can be useful for sizing potential markets. This is true when the company has a clear idea of how firm or product sales data is useful for benchmarking performance and as a benchmark against which company sales data can be measured, production may not be a reasonable metric if the market is served by both domestic and , company sales usually depend on market demand data. While there is no official government source for this type of information, reasonable synthetic estimates can be developed from the core of industry production, detailed private consumption and estimates of business investment spending by industry. Based on input-output relationships between industries and consumption-investment patterns, a more detailed map of demand by country can be developed. Market demand can be ultimately segmented for more than 400 individual product categories derived from personal consumption spending patterns, business investment spending by industry, and industry and service production detail.

In developing these (and in future other, more detailed industry forecasts), the goal is to provide users with a unique set of information that can explain business performance. Rather than selling complete databases, a unique sub-set of the right data would be developed and packaged into a database for use

³ Detailed, sector specific, market demand data is currently available. Based on public data and cleaned and forecast it is available as part of GlobalMetrix or products sold by DRI-WEFA. These data sets derive from work that I prepared first at DRI, later at ICF, and finally at MergeGlobal.

⁴ This data covers country production based on ISIC definitions. It is currently at the ISIC Revision 2 level of detail. It will ultimately have to be converted into ISIC Revision 3 which offers potentially greater detail. Critical to the success of this data set is the consistency of industry definitions. In many cases “synthetic” estimates are used to fill in missing data and to split aggregates between ISIC categories.

by the Integrated Planning System. The frequency of update may vary depending upon company requirements.⁵

Linking Internal Company Data with External Information

While company specific information on sales is often available on a daily basis to senior managers, Enterprise Resource Planning software can facilitate the analysis of corporate-wide data. Most ERP systems incorporate trend analysis to measure performance and forecast short-term growth. Such systems fail, however, when there are sudden, unexpected changes in economic conditions; trend analysis is incapable of preparing senior management for "what if" case studies. The Asian economic crisis in 1997-98 caught most major multinationals off-guard and unprepared for the downturn in the region after so many years of strong growth. While no forecasters were able to predict Asia's meltdown in advance, with a fully functioning IPS companies could quickly develop new plans and measure the likely impact on the bottom-line of a sudden change in the economic landscape.

Critical to the success of a genuine IPS is the process of continuous re-estimation of relationships between internal data. To be effective, economic relationships should always be fresh. Econometric relationships help companies identify diverging trends rapidly identify problems in terms of under performing sales units (see applications).

By re-estimating models often (weekly, monthly, quarterly) higher frequency company data can be seamlessly linked to less frequently refreshed historical and forecast information after from private forecasters or the government. Just as not all variables in a macroeconomic model are "new" each month, so too not all the information included in an IPS needs to be new.

The "pooled-cross-sectional-time-series" framework is efficient at modeling complex, multi-commodity data sets; while being consistent with theoretical models of demand that relate stages of economic development attained (see Appendix 1) to market requirements. While consultants complete the initial specifications of the system, once stable models are developed the IPS will be capable of functioning in a semi-autonomously. Databases created by a functioning IPS will always be "up to date" integrating the latest company performance data with external information on the stage of the global economy.

⁵ For example a company selling industrial chemicals used for pollution abatement might find a better metric against which to measure their potential sales the level of pollutants released since these will vary by

Applications – How an IPS Can Improve Performance

As corporations with global reach expand into the world they face multiple problems with managing operations spread out across continents. An IPS is designed to:

1. Monitor performance on an on-going basis with weekly and quarterly data on sales in IPS developed categories and in geographic areas, which can be compared against the company's short-term or medium term "plan" for sales.
2. Set realistic targets for subsidiary performance -- by measuring sales against economic standards derived from past relationships and economic activity. Financial targets can be established for subsidiaries and product-lines independently. When compared to plans drawn up by subsidiaries and regional managers' differences in market potential can be discussed in context.
3. Develop alternative scenarios, rapidly adjusting targets and performance goals when economic conditions shift rapidly.

An **Integrated Planning System** must be readily available to both senior and middle management.

Potential users include:

- Strategic Planners – for scenario planning exercises.
- Company Financial Officers for purposes of measuring and benchmarking individual sales unit performance, or for developing updated revenue projections based on the latest sales data and independent forecasts based on the latest economic forecasts.
- Sales and Marketing Staffs for setting reasonable targets and for sizing end-users requirements.

Examples of IPS's or Large-scale Multi-country Multi-Commodity Economic Models

Defense Economic Information Modeling System (DEIMS) was developed in the early 1980's to provide contractors with detailed forecasts of defense requirements for more than 300 industrial categories based on a 5-year plan. Drawing on classified data DEIMS translated these expenditures into direct and indirect requirements for industrial output, labor and raw materials each year. Forecasts showed requirements for primary products, industrial inputs, and finished manufactures, and business services.

industry.

Panama Canal Authority Planning Model was developed in 2000 to meet short-term, medium, and long-term planning requirements. The Canal Authority required a dynamic forecasting model linking internal canal traffic data (history) with external economic projections of global trade. The model had to be capable of measuring the impact of alternative trade and tariff assumptions on Canal traffic, transits, and revenues. A semi-automatic update procedure was established to link Canal traffic data (from internal databases) through econometric model and finally to a scenario based Access planning tool.

The World Sea Trade Service, developed in 1985 at DRI/McGraw-Hill, was one of the largest models specifically geared to the requirements of the maritime freight industry. While not a full IPS, in the sense of taking traffic data from a shipping company and integrating it with trade data, it nonetheless proved that complex data sets could be manipulated and relationships re-estimated, and improved, on a quarterly time table.

Some companies, notably IBM, have tried to institute consistency of market forecasts for hardware and software products from the top down. This project links a company-wide economic scenario with estimates based on global demographic data and computer/software specific factors to develop estimates of market potentials for setting sales targets. This system, however, does not directly link IBM sales to these projections. An IPS, however, is primarily designed to provide guidance on company performance, although it can also be used to benchmark company sales against industry-wide estimates of market growth.

Appendix I: Economic Models for Linking Internal with External Data

Economic and company data can be integrated into a single, seamless model using a multi-market, multi-product model development technique. This technique combines data across regions and commodities with data across time periods in a single estimation data set. As a result, it is very efficient in isolating trends and enables a small staff to manage a large set of relationships effectively.

Models of this type are ideal for examining differential trends in demand among countries of differing wealth and are particularly good at informing managers about the potential of a market. Time-series models are tied to existing demand patterns for single countries and cannot account for changing consumption patterns. Pooled -time-series models consider both short-term trends (for individual countries in the sample) and long-term structural changes that come from countries passing through differing stages of economic development.

Multi-dimensional systems have an equally important advantage over times series models. They work well with limited data sets. They do not require relatively long, continuous data series and have been estimated based on a single year of data. An important advantage is that they can define “potential” market demand, even when company data shows no current sales to these markets.⁶

⁶ For example a company may sell to 50 countries worldwide – rich and poor – through a variety of local distributors as well as wholly owned companies. Cross sectional-time-series models can estimate “likely”

