

Development In Business Simulation & Experiential Exercises, Volume 21, 1994

INTERNATIONAL OPERATIONS SIMULATION/MARK 2000 (INTOPIA)

Hans B. Thorelli, Indiana University

ABSTRACT

INTOPIA is being released at the beginning of 1994. It is a state-of-the-art international business strategy simulation. As such, it incorporates all aspects of management, but is rich enough to be used in marketing, operations, and finance courses. The products, geographical areas, and currencies may be changed by the facilitator. Virtually unlimited transaction freedom among companies: buy and sell, borrow and lend, license patents, hedge currencies, sell plants. No limit on decisions or entrepreneurial opportunities.

INTOPIA will be demonstrated at the ABSEL 94 conference.

INTRODUCTION

The realities of world business in the nineties includes high technology, business-to-business negotiations, foreign currencies, strategic alliances, joint ventures and "host country" relations. INTOPIA incorporates these features. The simulation is sophisticated enough to be eminently suitable in executive and university programs focused on the issues confronting any divisionalized corporation (coordination, accountability, intra-corporate transfers, make-buy, etc.), whether the company is domestic or global. (Domestically limited firms must expect foreign competition in their home market, barring import restrictions.) Government regulation of business may be more or less intense, depending on facilitator preference.

INTOPIA has a high degree of modularity in terms of geographical areas included, business functions emphasized, and products involved (industrial, consumer). It is also highly flexible, in that any one of 800 parameters can be reset by a few keystrokes.

The documentation includes an *INTOPIA Executive Guide* for participants by H.B. Thorelli, R.L. Graves and J-C Lopez and a *Compendium for Administrators* by Thorelli and Lopez, both published by Prentice Hall (1994). The *Compendium* is essentially limited to computer operations, and does not go into such generic questions as performance evaluation (on which we have some strongly held views, however). An honest effort has been made to make the simulation user-friendly, not least by providing well over a hundred dialog screens.

INTOPIA is most practical for 4-25 company teams, each consisting of 3-6 members. However, at Hochschule St. Gallen the simulation has been run successfully with 30 teams and 180 participants; the author is happy he was not the facilitator of that run.

STANDARD FEATURES AND RUNS

No matter the modularity and flexibility, both participants and facilitator have the need of initial default settings of all parameters. While parameters may be changed freely in the course of a run, the prudent administrator will restrain her/himself in the first full run or two.

In standard runs companies choose their own mission. This involves among other things defining the concept of their business. Clearly, an entrepreneurial activity, we maintain that defining any business requires a set of decisions along a handful of key dimensions:

Product: Chips and/or PCs, each in ten patented variants. Production of PCs requires 1-5 chips per unit. Only certain variants of chip

technology are compatible with a given variant of PC--and vice versa, giving rise to complex R&D, logistics and scheduling, as well as make-buy issues.

Mode of operations: Producer, distributor, specialty wholesaler, integrated producer-marketer, subcontractor, financial services and/or research institution.

Clientele: End consumers representing three different cultures, distributors, PC makers.

Area: Brazil, EC, USA.

Time: A decision period is a simulated Quarter (Q). Operations in one area (or product) may begin in one Q, operations in another area in another Q.

These entrepreneurial challenges stay with the company throughout the run. As default starting capital is a relatively modest Swiss Francs (SF) 20 million, no single company is ever likely to exhaust all entrepreneurial opportunities before the end of the game (after 6-10 Q). All companies are headquartered in Liechtenstein, which actually is said to have more MNC headquarters than its 30,000 inhabitants. L. was chosen for three reasons. It has a low tax rate. It is "neutral," not being located in any one of the operating areas, thereby hopefully preventing companies from choosing an operating area for nationalistic reasons. Its currency is hard and relatively stable, and sets a "lingua franca" (no pun) standard for intercompany comparisons.

Limited resources stimulate the search for a suitable balance between competition and cooperation so characteristic of contemporary hi-tech industries. Hence the emergence of numerous networks, strategic alliances and JVs. A company may, e.g., choose to be a PC maker end marketer in Europe, sourcing its chips from another firm in the USA and exporting a tranche of PC output to a Brazilian wholesaler. Participants quickly learn the significance of trust!

To prevent negative cash (disliked by accountants) from appearing on balance sheets, an "emergency exit" function is called on to bring cash up to 0. It is named Supplier Credit, symbolizing the fact that suppliers would like to keep the company as a customer. As they are not in the banking business they charge considerable interest. Cumulative Supplier Credit is a negative performance criterion at the end of the game.

As in practice, companies can choose between a variety of modes of entry into any given geographical part of the INTOPIA world. These operating areas differ widely in terms of currencies, inflation and interest rates, consumer market size and "culture," production functions, economic development and political stability, and so on.

The models underlying the simulation are all deterministic, with one important exception: the R&D function, which is semi-random, semi-deterministic. We believe that innovations do not automatically appear just because you throw money at them. In effect, R&D investments build a probability of yielding a patent based on the amount involved (with a diminishing returns function) and the consistency with which it is applied Q by Q. The probability cumulates until a patent is obtained, which happens when the probability matches or exceeds a random number freshly generated each Q. At the beginning of the next Q, the probability is set to 0; however, as the R&D group is now a smooth-working team, probability increases will now come faster,

Development In Business Simulation & Experiential Exercises, Volume 21, 1994

assuming constant R&D amounts each Q. The administrator may influence the stream of patents by resetting a "threshold" parameter whereby companies with probabilities exceeding the threshold automatically receive a patent. As practice sadly demonstrates, some patents are the delight of engineers, but consumers decide the resulting products are "duds." Companies can find out what grades of patents are lemons by (paid) marketing research, or, the hard way, by launching them in the marketplace. Patent licensing between companies is always possible.

THE WONDER CARD MODULE

The "Wonder Card" module, which allows the administrator to change any parameters as well as numerous "state variables" pertaining to the operations of individual companies, occupies roughly one-third of the Master Program. By means of a dictionary the administrator can readily find which parameter(s) should be changed to implement a given environmental event (such as a slowdown staged by European PC workers). Currency devaluation reasonably requires multi-parameter changes (primarily in the cost area) in addition to the exchange rate parameter. For this purpose, a "super-parameter" list is presented to the administrator as a reminder of possible concomitant changes. It is possible--and advisable--to prepare in advance a Wonder Card scenario for all foreseeable events, Q by Q. Modifications in the scenario can be made at any time.

Occasionally, it is desirable to change one or several state variables for one or several companies. The administrator may, e.g., have given an assignment to prepare an advertising campaign. S/he may recognize company performance by resetting VS13 Marketing Effectiveness Index (normally 1 .00) to 1 .10 or 0-92. This is an example of how qualitative factors may be more directly introduced in the game. If my heart bleeds for a company that forgot to set a price (=0 sales in the focal product-area market), I may provide a Johnson's Band-Aid for profit opportunity lost in terms of a modest cash injection in the balance sheet the following Q. Clearly, it is important to keep fairness relative to other companies in mind.

BRIEF NOTE ON FINANCIAL MANAGEMENT

As noted, a given area as well as HQ in Liechtenstein, may have any number of currencies on hand (in cash). To avoid foreign currency (FC) management area managers may indicate that they want the local bank to sell automatically all FC for local currency (LC). This may be taken as a certain weakness by the administrator. Ninety-day area bank loans (in LC only) are available up to a certain percentage of working capital in prior Q. Excess cash may be invested in local government securities (LC only), or may be transferred to HQ in form of service payment or profit take-home, or simply as disinvestment. Certain limits and tax consequences apply.

Generally, it is assumed that overall financial management is centralized to HQ. This is promoted by the fact that HQ may obtain loans from Citibank of Vaduz in any currency, and may likewise issue bonds (limits apply) and invest in government securities in any currency. HQ pays taxes and dividends (if any) in SF. Stock market confidence manifests itself in a dividend reinvestment function--occasionally shareholders are pleased enough to pay in more than the dividends received. Currency hedging can only be done through HQ. Realized and unrealized gain or loss on foreign currency exchange rate fluctuations are handled substantially in the manner of SFAS rules.

INPUTS AND OUTPUTS

Inputs are of three kinds: regular company decisions, Monitor company decisions (the administrator may, e.g., wish to represent Japanese competition) and Wonder Cards. There are some 15 different decision forms, although they can be reduced to 10 or 12 for purposes of simplification. In

addition to Balance Sheet and Income Statement, the quarterly company output comprises a Management Information System sheet, two pages of Foreign Currency Statements (in the course of intra- and intercompany transactions areas as well as HQ may have any mix of local and foreign currencies), a roster of decisions made in the Q, and a page of whatever free Marketing Research items the facilitator wishes to provide. There are 80+ marketing research and consulting services items, and the additional page(s), if any, carries whatever information the company ordered. The price schedule for such items is based on presumed value of the information to the company and the difficulty of procuring the data in practice.

The administrator would typically wish to have a copy of all company outputs. In addition, he gets a score of pages giving the data of all company decisions and transactions by type, consolidated company financial reports, and a copy of all current market research data, including a table of comparative financial ratios.

AUXILIARY PROGRAMS

Each team registers its decisions in a given Q on a company diskette for delivery to the administrator. The FORMIN™ program used is highly interactive; each decision form has its own screen and help routine. To facilitate budgeting and foreign currency analysis the program CASH+™ may be used. CASH+ also permits WHAT IF questions, such as what happens to cash flow if our sales forecast is off by + or -10%? Both teams and facilitator may also use the GRAPH+ program for Q-by-Q or intercompany graphic comparisons.

AVAILABILITY AND EQUIPMENT REQUIREMENTS

Academic institutions may request examination copies of the *Guide, Compendium*, and a set of PROMO disks from Prentice Hall or its college reps. Other potential clients should contact the author at the School of Business, Indiana University, Bloomington, IN 47405. Tel. (812) 855-8878. Fax (812) 855-8879, E-mail THORELLI@INDIANA.EDU. The INTOPIA Master Program and auxiliaries are also obtainable from the author. All diskettes used around the simulation are 3 1/2" high-density.

The administrator needs at least an IBM AT or compatible PC with 640K RAM and 8MB hard disk space free. Run time varies considerably with machines and number of companies and decisions, from 4 to 20 minutes. Printers are slower: HP LaserJet II with 15 companies, plus administrator output, around 30 minutes.

BIBLIOGRAPHIC NOTE

In addition to the INTOPIA documentation referenced above, the following items may be of interest:

Thorelli, H. B. & Graves, R. L. (1984) *International Operations Simulation, with Comments on Design and Use of Management Games* New York: Free Press-Macmillan. This is a description of predecessor INTOP simulation, and contains several chapters on game administration and design in general.

Thorelli, H. B. (1986) Networks: Between markets and hierarchies. *Strategic Management Journal*, 7, 37-51

Thorelli, H. B. (1990) International marketing: An ecological view. Lead article in H. B. Thorelli & S. T. Cavusgil, eds, *International Marketing Strategy*. 3d ed. Oxford, England: Pergamon.