Philippine Engineering Journal (1994) XV (1): 89-92

Research Brief

TAPPING THE OPERATIONS RESEARCH POTENTIALS

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RESEARCH AND DEVELOPMENT IN OPERATIONS RESEARCH

Research seeks facts and generalizations while development is directed toward specific tangible results. In Operations Research, promising new ideas are translated into successful applications within 5 to 10 years. As a result, there is little stockpiling of untested ideas. In the last 5 to 10 years, a lot of work have been done on, among others:

1. Karmarkar LP Algorithm and Variants
2. Multiple Criteria Decision Making (e.g., Analytic Hierarchy Process)
3. Optimization of Flexible Manufacturing Systems
4. Seeking Efficient Solutions to Combinatorial Problems
5. OR/AI Interface
6. Soft Systems Methodology

Research and development on techniques and methodologies have been going on at a frenetic pace in universities and institutions abroad. Tangible benefits of using their products have been achieved, but unfortunately this could not be generalized for the Philippine setting. The succeeding material will focus on what I believe is more fundamental: problems, opportunities, barriers and areas for research towards and effective adoption of OR in the local context.

OPPORTUNITIES AND PROBLEMS

In the following examples, Operations Research has been used to structure and improve complex decisions:

- Vilpac Corporativo, of Mexico implemented a computer integrated

manufacturing system and simulation to increase truck production 260%, reduce fixed costs by 26% and increase net profits by 70%.

- The Columbus Discovery Group used search theory to guide the successful hunt for the SS Central America, lost at sea 130 years ago. They recovered gold and valuable worth $1 billion
- Hidroelectrica Espanola, S.A. used mathematical optimization techniques to assist in the management of reservoirs and generating facilities.
- New York City redesigned the criminal processing system for arrest to arraignment time.
- The US Military Airlift Command's automatic scheduling support system laid a key logistics role in Operation Desert Shield.
- L.L. Bean applied queuing models to structure their global telemarketing effort.
- Bethlehem Steel's optimal ingot size selection procedures impacted all plants, saving $5M annually.
- Texaco's optimal blending system netted $15 million annually.
- IBM's multi-echelon inventory system reduced inventory by 20% while maintaining or improving services.

In the local scene, San Miguel Corporation was awarded the ORSA (Operations Research Society of America) Prize for exemplary and on-going use of OR for organizational decision-making. Sharing this prize with such past winners as American Airlines and Federal Express, SMC has obtained recognition for its use of OR.

Given these opportunities, use of OR is not as widespread locally as one would expect. An ORSP (Operations Research Society of the Philippines) survey on the use of OR indicate 66% have used OR - half of whom use it on a regular basis. This would be a good figure if not for the fact that the response rate was a mere 10%. It will be unscientific to assume that the 90% non respondents do not have any OR experience but discussions among ORSP members indicate that this may be closer to reality than one would logically conclude.

BARRIERS

Barriers towards an OR implementation cited by the ORSP survey respondents include the following:

1. General lack of application. The most frequently encountered problems for non-users is lack of awareness. Users, on the other hand, have to grapple with clients of top management who are not knowledgeable or who do not have the educational background to appreciate the techniques.

2. Lack of expertise and talent. The practice is faced with a scarcity of qualified individuals and thus is constantly faced with high turnover and brain drain.

3. Lack of data. The existing information system infrastructure is the organizations surveyed could not support the numerous data requirements of OR models.

SPECIFIC RECOMMENDATIONS

A first attempt at identifying the factors contributing to the limited use of OR has been carried out in the ORSP Survey. This could be extended to include:

1. An in-depth investigation on the use of OR correlated with:
   - functional area of application
   - firm size
   - user's educational background
   - position of project sponsor
   - computer usage
   - position in the organization vis-a-vis IS function
   - productivity and profit impact

2. Empirical identification of implementation barriers beyond the observation/opinion approach.

3. Determination of kind of OR personnel required for successful OR.

This approach could be instrumental in identifying factors that could make OR work, for use by current or would-be-OR managers. Along with ORSP programs directed at increasing awareness among students and top management, this is a significant step toward helping ensure an effective adoption of OR in the Philippine setting.