



*Determinants of Success in Operations Research  
Projects: A Practitioner's Perspective*

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## *Determinants of Success in Operations Research Projects*

### Birth of O.R. as a Discipline

- 1937 can be considered to be Base Year as this was the year the term Operational Research [O.R.] was coined.
- During WW II ,the Royal Coastal Command [RCC] of the British Armed Forces wished to protect the royal merchant ships in Atlantic ocean from being decimated by the German U Boats, to enhance the ability of royal air force to sight U Boats in time and to improve the effectiveness of patrol of coast with a given aircraft fleet size.
- RCC constituted a special team of Henry T. Tizard, Professor P.M.S.Blackett, and A.V. Hill.They were specialists in Chemistry, Physics and Anatomy respectively. They worked with many others in military operations with background in a variety of other disciplines.

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### Birth of O.R. as a Discipline

- Time was of essence here. Solutions had to be found quickly, often in days or weeks but not in months. Proposed solutions could not be simulated for verification of effectiveness yet any wrong solution could spell doom for the entire operation.
- Blackett and the team relied on available but limited data to study each of the stated problems and to give it a focus
- They were lateral thinkers who asked for painting the aircrafts white to reduce their visibility against a light sky
- They converted the coast patrol problem into one of effective maintenance of aircrafts.
- They suggested that the size of convoy of merchant ships be increased to minimize damage to them against enemy attacks.

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### Birth of O.R. as a Discipline

- The team was interdisciplinary in skills.
- It understood the time criticality of the problem and evolved timely solutions.
- It took an objective , data based approach for situation analysis, solution construct and evaluation of solution effectiveness.
- The researchers were capable modelers as they knew the concepts and their applicability.
- They were innovative.
- They had management support from start to end.
- Above all, they were tackling real world problems.

***Should we ever wonder why they succeeded ?***

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### Growth pangs of O.R.

- Considerable expansion and success in Industry and academia during the 50s and 60s.
- 96% of Fortune 500 companies had in-house O.R. groups in 1970
- but the numbers dwindled by the 1980s.
- Many practitioners of O.R. began questioning its utility, applicability and even its survivability within four decades of its existence.
- Ackoff fueled this debate in 1979 with an assertion that “The future of Operational Research is Past”.
- In 1997, Gass proposed that in many lines of business, issues pertaining to fundamental activities have been modeled and O.R. has saturated.



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Growth pangs of O.R.

- Chamberlain's agony even in 2004 that O.R. faced the challenge of "to get the decision maker to pay attention to us" and to " get the practitioner and academics to talk to each other"
- And this debate seems to be in a continuous present tense.
- The fundamental issue has been the gap between developments on the theoretical front versus the application of O.R. models and concepts in practical circumstances.

## *Determinants of Success in Operations Research Projects*

### *The Four Legs*

*My detailed study of innumerable O.R. projects (both successful and failed) reveals four discriminants of success, namely*

- Problem formulation in an inclusive mode with all stake holders
- an appropriate model ( that recognizes time criticality , organization structure for decision making and ease of availability of data)
- management support at all stages of the project
- innovative solution

*They seem to be time invariant. They hold well when applied to the pre internet era as well as current period*

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### Leg 1: Problem Formulation in an inclusive mode

- Identifying all stakeholders and getting their commitment to participate from the beginning
- This has to be a part of the project process
- The Stakeholder involvement enables scoping the project appropriately, facilitates problem construction in a comprehensive manner and eases the path for solution implementation .
- It recognizes and accepts the decision making role assigned to stakeholders and creates an inclusive environment.
- It is a natural route to forming a multidisciplinary team



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### Leg 2: Evolving appropriate models

- The model is not reality but a simplified and partial representation of it. Model solution needs to be adapted to reality
- O.R. Practitioners often lament about the quality or reliability of data and non availability of data at the desired micro level at the right time as per model needs.
- The role of the practitioner is to have a firm grip on data quality, availability and reliability at the early stages so that an appropriate model is constructed.
- The relationship between model and data is not independent but interdependent.
- Model based solutions need to be operationalised in current time

***This has turned out to be the Achilles' heel of O.R. professionals.***

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### Leg 3: Ensuring management support

- O.R. functionaries are housed in Corporate Planning, Production Planning & Scheduling, Management Information Systems [MIS] or Industrial Engineering [IE] departments or in an O.R. Cell. They tend to be in staff functions
- Direct responsibility to manage resources ( machines, materials, money or workforce) rests with functional departments such as Production, Purchase, Finance and HRD. The onus to form an all inclusive stakeholder team rests with the O.R.
- Most organizations are goal driven. These are generally short term. The time horizon can be as short as a quarter and rarely extend beyond a year. The functional departments mirror this reality with monthly goals to meet.

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### Leg 3: Ensuring management support

- Many O.R. assignments originate with top management support. As the project progresses, issues and conflicts arise between departments resulting in inordinate delay in project execution.
- Management support soon evaporates as timely solution is not found .
- Change Agent role of O.R. Playing this role effectively calls for many skills such as excellent articulation, unbiased representation of all interests, negotiation and diplomacy. O.R practitioners need to ensure that they are adequately skilled to do justice to these role requirements

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### Leg 4: Innovative Solutions

- Andy Grove, Intel's then Chief says *"The tenors always sang tenor, the baritones, baritone, and the basses, bass. As a patient whose life and well-being depended on a meeting of minds, I realized I would have to do some cross-disciplinary work on my own."*
- Ability to build a whole greater than the sum of the parts
- Revenue Management System of American Airlines
- The Computerized Reservation System of Indian Railways. Phenomenal success due to innovations introduced in the system using O.R. concepts.
- Application software maintenance

## *Determinants of Success in Operations Research Projects*

### Career growth of the O.R. professionals



- Their services are required at all times.
- Their role rarely raises above that of a middle or senior management position.
- There are no equivalent top management positions such as Chief Finance Officer [CFO], Chief Operations Officer [COO] and CEO for them. (Some with Information Technology [I.T.] skills can become Chief Information Officer [CIO]s).
- Diversifying their skill base (beyond quantitative) is a precondition for growth of any O.R. professional in most organizations.

Thank You

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