Strategic Decision Making in Modern Manufacturing

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Harinder Singh Jagdev
University of Manchester
Institute of Science and Technology (UMIST)
United Kingdom

Attracta Brennan
National University of Ireland
Republic of Ireland

Jimmie Browne
National University of Ireland
Republic of Ireland

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To:

- In the loving memory of my parents Balbir Singh and Prakash Kaur
  – I am sure we'll meet again
- Hardeep, Harjit and EG (my *bobykins*)
  – The gleams of sunshine of my life
- My parents Matt & Mona and Des, Elena, Bernie and David
  – You have left footprints on my heart
- Maeve, Lorcan, Shane, Ronan and Fergus
  – They give meaning and perspective to my life

Jab Tun Aaya Jagat Mein, Log Hanse Tu Roye
Aise Karni Na Kari, Pache Hanse Sab Koye
– Kabir

Contradictions do not exist. Whenever you think that you are facing a contradiction, check your premises. You will find that one of them is wrong.

– Ayn Rand *(Atlas Shrugged)*

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Preface

I never think of the future, it comes soon enough. – Albert Einstein

The rapid pace of technological innovation and the effects of the Information and Communications Technology (ICT) revolution have resulted in dramatic changes on a global scale, from the empowerment of the individual to the spawning of global markets. From the business perspective, the widespread deployment of Information Technology (IT) has resulted in many organisational changes and the development and use of new management and business processes. An important challenge for today's manufacturing organisations is to be able to anticipate the impact of investments in new (frequently IT based) manufacturing technologies and programmes. Ideally, management need to be able to identify and articulate the many ways in which investment decisions influence their organisation - in terms of human resources and skills needs, organisational structures, resource requirements and performance across a range of measures. The underlying question therefore is; how can management both anticipate the effects, and measure the success of technological and/or programme investment decisions?

One answer to this question is to develop and use tools, which bridge the gap between strategic management considerations and the operational effects of technology investments on the manufacturing organisation, so that the likely impact of new manufacturing technology and/or programme implementations can be evaluated, anticipated and accurately predicted. Such bridging is important, because in today's manufacturing environment, it is increasingly necessary that a close relationship exists between manufacturing decision making and corporate business strategy, so that manufacturing decisions complement and are fully aligned with the organisation's strategic objectives.

The **AMBIT** (**A**dvanced **M**anufacturing **B**usiness **I**mplemen**T**ation) approach has been specifically developed to bridge this gap between strategic management and manufacturing management and, act as an enabler of manufacturing technology and programme investment decisions. AMBIT focuses specifically on the non-financial aspects of such investments and offers an approach which allows a manager, or more frequently a management team, to understand the impacts of a new technology or a new programme on the manufacturing organisation in terms of manufacturing performance.

The project which financed much of the development of the AMBIT approach was a fundamental research project funded by the European Union through its BRITE-EURAM research programme.

This book is structured in a way in which we believe shows the logical development of the AMBIT approach.

- **Chapter 1** presents an overview of the IT revolution and its general impact on organisational activity. It describes the importance of innovation, flexibility, strategy and managerial decision making. It reconsiders the traditional managerial role in the context of new managerial mindsets and competencies.
- **Chapter 2** summarises the key concepts relating to performance measurement. The underlying assumption of this chapter is that appropriate performance measurement is critical to success in any organisation because the use of inappropriate performance measures may lead to dysfunctional behaviour and consequently, poor organisational performance. This chapter compares traditional and contemporary performance measurement systems and introduces the reader to currently available performance measurement approaches.
- **Chapter 3** presents an overview of the AMBIT approach. It describes the importance of articulating a clear manufacturing strategy in the development of a competitive position. Furthermore, it outlines and discusses the reasons for developing the AMBIT approach.
- **Chapters 4** through **6** inclusive, detail the structure and the three key stages of the AMBIT approach.
    - In chapter 4, the AMBIT performance measurement framework and the MOMP (Measures of Manufacturing Performance) map are presented. We believe that these represent some of the more critical features of the AMBIT approach. The AMBIT performance measurement framework shows how the organisation's business goals (expressed in terms of its critical success factors (CSFs)) can be linked to its manufacturing strategy by means of the measures of manufacturing performance (MOMPs).
    - In chapter 5, the manner in which the technology and programme issues are linked to the manufacturing strategy is described. We also outline the technologies and/or programmes which management might wish to implement in the manufacturing plant. We do this by using an example technology, namely *interconnect technology* (used in the electronics assembly industry) and an example programme, namely *concurrent engineering*. A proposed approach for the linkage of the technology and programme issues to the manufacturing strategy (and performance) is outlined. Such a linkage is necessary in order to assess the impact of the proposed technology an/or programme on manufacturing performance.
    - In chapter 6, a selection of analysis tools which can be used to support the manager or team of managers in evaluating the strategic and operational

effects of a particular technology or programme implementation are introduced. These tools include Analytic Hierarchy Process (AHP), Case Based Reasoning (CBR) and Semantic Modelling.

- Finally, Chapter 7 introduces the reader to ideas and concepts that might prove useful in developing an effective computerised tool-set to support the AMBIT approach. In this chapter, the manner in which individual learning and creativity are facilitated through the design of the tool is examined.

As the goal of the AMBIT approach is to act as an enabler of manufacturing technology and/or programme investment decisions, we have used various example programmes and technologies to validate the overall approach. Whilst interconnect technology, concurrent engineering, business process re-engineering and lean production are used as examples of technologies and programmes to illustrate the workings of the AMBIT approach, it is important to stress that there is no particular significance attached to their choice. Programmes such as Total Quality Management (TQM), Lean Manufacturing and Flexible Manufacturing Systems (FMS) could just as easily have been selected.

We see AMBIT as an approach which allows a manager or a management team to consider and articulate in advance, the likely consequences of major technology and/or programme decisions on a manufacturing organisation. Clearly AMBIT, if it is to be truly effective, needs to be supported by appropriate software tools and (ideally) an integrated tool-set. The development of such at tool–set is beyond the scope of this book.

The prediction of future outcomes is a very imprecise and ambiguous activity at the best of times. Yet despite such ambiguity and uncertainty, it is no longer wise for managers to steer the organisation into the future by looking over their shoulder. Managers need to be forward looking. They also need appropriate tools and approaches to support them in their task. Thus, whilst the pages of organisational history may be filled with anecdotes about organisations which failed to anticipate the future, it is the challenge of today's organisations to evade such a fate.

H.S. Jagdev, A. Brennan, J. Browne
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About the Authors

Harinder Singh Jagdev graduated from Indian Institute of Technology, Madras, in Mechanical Engineering in 1974. After working for two years as Production Engineer at Mercedes Benz, he joined UMIST, where he gained M.Sc. and Ph.D. in Manufacturing Technology from Victoria University of Manchester. Since 1980 he has researched for and been consultant to many organisations in Europe. He is also very active in the EU-funded research programmes, both as a proposal and project reviewer on behalf of the Commission and member of the research consortia. He is the editor of journal Computers in Industry and also serves the editorial board of Production Planning and Control.

Attracta Brennan is a lecturer in the department of Information Technology at the National University of Ireland, Galway. She holds a Ph. D. degree from CIMRU, at NUI Galway. Her research interests are in the areas of design, creativity, learning and innovation management.

Jim Browne is Registrar and Deputy President of the National University of Ireland, Galway, as well as the founder of CIMRU there. He is also a former Dean of Engineering in Galway. He holds Bachelor and Master's degrees from NUI Galway and Ph.D. and D.Sc. degrees in engineering from UMIST in Manchester. He has authored or co-authored more than 200 papers, and co-authored or co-edited 11 books. His research interests are in the modelling, design and analysis of extended enterprises and virtual enterprises.