# Contents

Advisory Board for the Series ........................................... vii
Contributors ................................................................ ix
Foreword
*Riccardo Petrella* ............................................................ xi
Series Preface
*Bernhard Wilpert* ............................................................ xiii
Preface ........................................................................... xv
Acknowledgements ............................................................ xvii
Abbreviations ................................................................ xix

**Section 1: Overview and ‘Predicted Trends’ Towards the ‘Flexible Factory’**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>Introduction</td>
<td><strong>Werner Wobbe</strong></td>
<td>3</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Integrated Technical Concepts: Towards the Fully Automated Factory</td>
<td><strong>Hans-Jörg Bullinger</strong></td>
<td>15</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>Flexibility as Managers See It</td>
<td><strong>Nigel Slack</strong></td>
<td>33</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Changing Concepts of Work and Qualifications</td>
<td><strong>Michael Schumann</strong></td>
<td>49</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Qualification and Skill Requirements</td>
<td><strong>Alain d’Iribarne</strong></td>
<td>61</td>
</tr>
</tbody>
</table>

**Section 2: Conditions Which Make Flexible Production Work**

| Chapter 6 | Organisation and Integration of Production Systems                  | **Bill Haywood and John Bessant** | 75   |
| Chapter 7 | Process-related Skills: Future Factory Structures and Training     | **Rainer Schultz-Wild**        | 87   |
| Chapter 8 | Technocentric–Anthropocentric Approaches: Towards Skill-based Manufacturing | **Peter Brödner**               | 101  |
| Chapter 9 | Design for Human–Machine Interfaces                                 | **J. Martin Corbett**         | 113  |
| Chapter 10 | Strategic Options for CIM Integration                               | **Gunter Lay**                | 125  |
CONTENTS

Section 3: Selected European Perspectives

Chapter 11. A European Overview of Work and Vocational Training
                Arndt Sorge .................................................. 147

Chapter 12. Technical Projects and Organisational Changes: Flexible
                 Specialisation in Denmark  Peer Hull Kristensen .... 159

Chapter 13. Flexible Manufacturing Systems and Cells in the Federal
                Republic of Germany  Jutta Fix-Sterz, Gunter Lay,
                Rainer Schultz-Wild and Jürgen Wengel .............. 191

Chapter 14. The Diffusion of Programmable Automated Systems and
                 its Work and Training Implications in the Netherlands
                Rob Bilderbeek ........................................... 213

Chapter 15. A European View of Advanced Manufacturing in the
                 United States  Werner Wobbe ............................. 227

Section 4: Strategic Management Applications

Chapter 16. The Factors behind Successful Technology Innovation
                Martin Locket ............................................. 239

Chapter 17. Managing Advanced Manufacturing Technology
                Adrian Campbell and Malcolm Warner ................... 253

Index ................................................................. 265