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Alternative manufacturing developments from the semi-periphery: the case of human-centered manufacturing approach in Brazil

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ALTERNATIVE MANUFACTURING DEVELOPMENTS FROM THE SEMI-PERIPHERY : THE CASE OF HUMAN-CENTRED MANUFACTURING APPROACH IN BRAZIL

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June 1998 **Gustavo A.C. Guzman**

ABSTRACT

The key research question of this study is to determine if Brazilian firms are applying the human-centred manufacturing approaches and if so, to explore how and to what extent this is happening. From this, two related research topics emerge: (i) how macro contextual conditions support or constrain the implementation of the HC model; and (ii) which are the main technical and organisational features of a 'tropicalized' (adapted) HC model in Brazilian firms. In order to address these questions, case studies were carried out in 10 Brazilian firms. The aim of the empirical study was to determine the form and level of human-centredness in these firms and to explore the factors affecting this. An examination was then made of the patterns of human-centred development and its links with product, process and environmental factors, identified in the literature as key influences on HC systems developments. Two theoretical approaches were used to inform the empirical component of this study in order to explain the application of New Production Systems and, specifically the Human-centred approach in the semi-periphery. Firstly, the examination at the level of the firm, integrates constructivist views of people, technology and organisation with the concept of manufacturing engineering systems as well as the organisation configuration approach. This helps to understand "how" the human-centred approach was applied in Brazil. Secondly, a political economy examination of the macro contextual factors assisted to understand "why" related questions. Key findings of this study refer to the wide range of adaptation to local conditions of new production systems. This is explained by contextual institutional factors, such as industrial relations and regional labour markets. In contrast to established human-centred theory, the degree of human-centredness in the organisational arena was not strongly linked to either (i) human-centred designed technology; (ii) to new product market variety and change; or (iii) characteristics of the firm.

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Abbreviations

AMT	Advanced manufacturing technology
APS	Anthropocentric production systems
BRITE	Basic research in industrial technologies for Europe
CAD	Computed-aided design
CAM	Computer-aided manufacturing
CIM	Computer integrated manufacturing
CLP	Capitalistic labour process
CNC	Computer numerical control
CPU	Central process unit
DQP	Diversified quality production
ESPRIT	European strategic program for research and development in information technology
EURAM	European research for advanced materials
HC	Human-centred
HCMS	Human-centred manufacturing systems
IBGE	Instituto Brasileiro de geografia e estatistica
FAST	Forecasting and assessment in Science and Technology
FDI	Foreign direct investment
FMS	Flexible manufacturing system
GDP	Gross domestic product
GNP	Gross national product
GT	Group technology
ITC	Indigenous technological capability
ISI	Import substitution industrialisation
JIT	Just-in-time
MES	Manufacturing engineering systems
MNC	Multinational companies
NC	Numerical control
NCMT	Numerical control machine tool
NIC	Newly industrialised country
NPC	New production concepts
NSI	National systems of innovation
OEM	Original equipment manufacturer
PCF	Product customisation feasibility
PPC	Production planning and control
R & D	Research and development
SBIC	Study of the Brazilian industrial competitiveness
SENAI	Servico nacional de aprendizado industrial
SOE	State-owned enterprise
SPC	Statistical process control
STS	Science, Technology and Society
S & T	Science and technology
TNC	Transnational companies
TQM	Total quality management
TU	Trade union
UMIST	University of Manchester institute of sciece and technology
WIP	Work in-process