

Manuela Koch-Rogge

Assessing Service Performance

Applying Data Envelopment Analysis for
evaluating employees' performance in the
Service Industry

ANGLIA RUSKIN UNIVERSITY

ASSESSING SERVICE PERFORMANCE:
APPLYING DATA ENVELOPMENT ANALYSIS
FOR EVALUATING EMPLOYEES'
PERFORMANCE IN THE SERVICE
INDUSTRY

by

MANUELA KOCH-ROGGE

A thesis in partial fulfilment of the requirements of Anglia Ruskin University for
the degree of Doctor of Philosophy

Submitted: April 2019

Operations Research

Manuela Koch-Rogge

Assessing Service Performance

Applying Data Envelopment Analysis for evaluating
employees' performance in the Service Industry

Shaker Verlag
Düren 2019

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <http://dnb.d-nb.de>.

Zugl.: Anglia Ruskin University Cambridge, Diss., 2019

Copyright Shaker Verlag 2019

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 978-3-8440-6870-2

ISSN 1862-6327

Shaker Verlag GmbH • Am Langen Graben 15a • 52353 Düren

Phone: 0049/2421/99011-0 • Telefax: 0049/2421/99011-9

Internet: www.shaker.de • e-mail: info@shaker.de

Acknowledgements

Taking the first steps into the academic community is a unique experience. Working on a thesis is a challenge that spans over years involving amounts of literature to read, theories to understand, different opinions to evaluate, studies to carry out and conclusions to draw. Along this journey, there are many exiting and enlightening moments, like presenting parts of your work to academic colleagues for the first time or getting your paper accepted by scientific journals. However, there are also many obstacles and moments of frustration along the way. For me, this includes following a particular direction of research that leads to a dead end or just fighting with editing and formatting issues. It's in particular during those times that some people that follow you on that journey become most important.

First of all, I would like to thank my supervisors, who supported me in complementary ways. I thank Professor Georg Westermann, who facilitated my dissertation at Anglia Ruskin University in the first place and whose support was the main guidance towards the completion of this thesis. I also thank Dr Chris Wilbert, Prof Georg Westermann and Dr Rob Willis for their valuable comments and expertise when conducting my thesis, but also for their reassurance to present my work to the academic community. Also, I am very grateful for the financial support of ARU's Lord Ashcroft International Business School.

I thank all the people who took part in my empirical work, in particular the ones who agreed to participate in the case study and the subsequent assessment. My thanks also go to my department colleagues and the network of researchers who I worked with and met during my research.

Very special thanks go to my family. I thank my husband, Steffen, who not only supported me emotionally but also professionally. Finally, I would like to thank my parents, Martina and Bernd, for their constant support and encouragement during these years.

Thesis abstract

The service industry is the most important economic sector worldwide. Thus, economic growth within developed economies is almost exclusively based on services. In the production of services, employees have a crucial influence on the perceived quality of the output, since they are the core of the interaction with the customers. In this context, employees' knowledge and skills are primary resources for an organization's ability to compete and generate profits. The adequate evaluation of employee performance, employee empowerment and a concern for training therefore becomes a necessity for each service organization. However, traditional approaches for evaluating employee performance mostly originate from the manufacturing sector and therefore often fall short in accounting for the advanced requirements of evaluating service performance. A promising approach that may be able to address several of the shortcomings of traditional performance evaluation approaches is the Data Envelopment Analysis (DEA), which has widely been used to evaluate the performance of organizations in a variety of contexts. However, there is still very little experience regarding the application of DEA on individual level and employee's response to it.

Adopting a case-study strategy based on a mixed methods approach, this research investigates DEA's technical and organisational suitability for evaluating employees' performance in the service sector. After reviewing literature on why services may require an advanced approach for performance evaluation and on DEA's previous applications in organizational contexts, the DEA approach was applied to performance data of 40 service employees in a German Cooperative Bank to gain empirical evidence. Hence, in a quantitative analysis, the results of the application were examined to assess DEA's technical suitability and to gain a deeper understanding of its application on individual level. Subsequently, focus group interviews among bank managers and members of the workers' council as well as a questionnaire study among employees were carried out to investigate DEA's perception by all major stakeholders and thus provide substantiation of its organizational suitability. Eventually, the evidence from these multiple sources was analysed by triangulation.

The findings indicate that DEA is a suitable approach to overcome many shortcomings of traditional approaches. Thus, the thesis concludes by summarizing the results, reflecting on limitations and by pointing out implications that may contribute to draw analytic generalizations to inform theory and practice.

Table of Contents

ACKNOWLEDGEMENTS	III
THESIS ABSTRACT	IV
TABLE OF CONTENTS.....	V
LIST OF FIGURES.....	IX
LIST OF TABLES	X
1 INTRODUCTION.....	12
1.1 The Role of Employee Performance in the Service Industry	13
1.2 Requirements for evaluating Employee Performance in the Service Sector	14
1.3 DEA for evaluating employee performance in the Service Sector.....	16
1.4 The scope of the Thesis	17
1.4.1 Research Objectives and Research Questions	17
1.4.2 Contribution of Research.....	18
1.4.3 Delimitation.....	19
1.5 Structure of the Thesis	20
2 INTRODUCING DATA ENVELOPMENT ANALYSIS (DEA)	22
2.1 The history and rationale of DEA	22
2.2 The basic CCR model.....	25
2.3 Extensions to the basic model.....	30
2.3.1 Slacks and the non-Archimedean element.....	30
2.3.2 Variable returns to scale.....	31
2.3.3 Incorporating uncontrollable variables.....	33
2.3.4 Incorporating qualitative data	35
2.3.5 Restriction of weights	36
2.4 DEA Sensitivity analysis - the problem of outliers	37
2.5 DEA Applications in the banking industry and on employee level	39
2.5.1 DEA applications in the banking industry on institutional and branch level	39
2.5.2 DEA Applications on individual level.....	41

3	INTRODUCING PERFORMANCE MANAGEMENT AS A DOMAIN OF HUMAN RESOURCES MANAGEMENT	45
3.1	The practice of HRM	45
3.1.1	The essence of HRM.....	45
3.1.2	HR strategies and practices.....	47
3.1.3	Critical evaluation of HRM.....	48
3.2	Performance Management as a domain of HRM	51
3.2.1	Defining Performance.....	51
3.2.2	The Evolution of Performance Management	53
3.2.3	Managing individual performance	56
3.2.4	Approaches for managing performance.....	58
3.2.5	PM Approaches on organizational level	59
3.2.6	PM Approaches on individual level.....	66
3.2.7	Data Envelopment Analysis for assessing individual performance	81
3.2.8	The impact of HRM and Performance Management on performance.....	82
3.2.9	Issues with Performance Management.....	86
4	DESIGNING A PERFORMANCE EVALUATION SYSTEM.....	90
4.1	Purpose and stakeholders.....	90
4.1.1	The Stakeholders of a PES	90
4.1.2	Purposes of a PES	91
4.2	Requirements to a PES	94
4.2.1	Importance of perceived fairness	94
4.2.2	Influence of rater’s bias.....	96
4.2.3	Provision of feedback information	97
4.2.4	Linkage of performance results to pay and to target achievement.....	98
4.2.5	Use of balanced criteria.....	99
4.2.6	Stimulation of continuous improvement/right behaviour	100
4.3	The Performance Management Cycle.....	101
4.3.1	Performance Planning	102
4.3.2	Execution of Performance Evaluation.....	105
4.3.3	Performance Assessment	106
4.3.4	Performance Review.....	107
4.3.5	Considerations to the design of a PES	108
4.4	Contextual considerations for the case study.....	108
4.4.1	Labour market and political framework conditions	109
4.4.2	Legal considerations.....	110
5	MANAGING BANKING SERVICES	113
5.1	The Evolution and Definition of Services.....	113
5.2	Distinctive Characteristics of Services.....	116
5.2.1	Generalizability of service characteristics.....	117
5.2.2	Service Classifications.....	118

5.3	The Role of Human Labour in the Service Sector.....	121
5.4	Banking Services.....	122
5.4.1	The role of financial institutions in an economy.....	122
5.4.2	The financial sector in Germany.....	123
5.4.3	Classifying Banking Services	126
6	RESEARCH METHODOLOGY AND CONCEPTUAL FRAMEWORK	130
6.1	The Conceptual framework	130
6.1.1	Synthesis of literature review	130
6.1.2	Construction of the Conceptual framework.....	131
6.2	Research Design and Methodology.....	134
6.2.1	Research Philosophy.....	135
6.2.2	Research Design.....	141
6.2.3	Data Collection and Analysis	150
6.2.4	Ethical Considerations.....	159
6.2.5	Validity and Reliability.....	161
6.2.6	Methodological Limitations of the research project.....	163
7	APPLYING DEA TO EVALUATE EMPLOYEE PERFORMANCE: A CASE STUDY	166
7.1	Performance Planning.....	166
7.1.1	Background of the case study.....	167
7.1.2	Defining the purpose and requirements of the performance evaluation.....	169
7.1.3	Defining the performance process and deducting performance dimensions.....	170
7.1.4	Defining performance measures.....	172
7.2	Performance Execution: Data collection and model building.....	177
7.3	Performance Assessment	182
7.3.1	Results for transformation stages 1 - 5.....	182
7.3.2	Sensitivity analysis.....	191
7.4	Performance Review.....	202
7.4.1	Reviewing results on employee-level.....	202
7.4.2	Reviewing results on organizational level.....	205
7.5	Conclusions from the case study	208
8	ASSESSING THE APPLICABILITY OF DEA FOR MEASURING EMPLOYEE PERFORMANCE	209
8.1	Assessment by management and workers' council	209
8.1.1	Planning and Conducting the Focus Group interviews.....	209
8.1.2	Data Analysis.....	216
8.1.3	Results.....	218
8.2	Assessment by employees.....	226
8.2.1	Planning and conducting the questionnaire survey.....	226

8.2.2	Data Analysis and results.....	230
8.3	Findings.....	245
8.3.1	Strengths.....	245
8.3.2	Weaknesses and Limitations.....	246
8.3.3	Controversial issues.....	247
9	CONCLUSION.....	249
9.1	Research questions and major findings.....	249
9.1.1	DEA's technical suitability for evaluating employees' performance in the service sector 249	
9.1.2	DEA's organizational suitability for evaluating employees' performance in the service sector 251	
9.2	Relationship to previous research.....	254
9.3	Implications.....	255
9.3.1	Theoretical Implications.....	255
9.3.2	Practical Implications.....	259
9.4	Limitations and further directions.....	261
9.4.1	Limitations.....	261
9.4.2	Directions for future research.....	263
	<i>REFERENCES</i>	265

List of figures

Figure 1: Structure of the thesis.....	20
Figure 2: slacks in DEA	30
Figure 3: variable returns to scale.....	32
Figure 4: the concept of superefficiency.....	38
Figure 5: Schematic representation of a performance management system (Folan and Browne, 2005)	53
Figure 6: The Evolution of Performance Management.....	56
Figure 7: Integrated Performance Evaluation System.....	59
Figure 8: Measurement Framework Fitzgerald et al. (1991).....	60
Figure 9: Performance Pyramid, (modified from Pun and White, 2005).....	61
Figure 10: The Balanced Scorecard (Kaplan, Norton 1992).....	62
Figure 11: Application of PMAs (modified from Schläpke et al. (2012)).....	66
Figure 12: Job performance in context (modified from Aquinis, 2009).....	67
Figure 13: classification of performance measurement approaches (modified from Manhoran et al., 2009 and Shields et al. (2015)).....	68
Figure 14: Visual Assessment (modified from Armstrong and Taylor, 2014)	77
Figure 15: HRM impact on Performance logic (Savaneviciene and Stankeviciute, 2010).....	84
Figure 16: Purposes and uses of PES information (Kondrasuk, 2012; Meyer, 1991; S. L. Thomas and Bretz, 1994).....	92
Figure 17: Structural and Procedural elements the PM cycle.....	102
Figure 18: performance measure record sheet (Neely et al., 1997).....	104
Figure 19: Guidelines for designing performance measure (Thor, 1993), adapted from (Tangen, 2004)	104
Figure 20: The service matrix (adopted from Schmenner (1986).....	119
Figure 21: Model of service processes (Silvestro et al., 1992).....	120
Figure 22: The Banking system in Germany (German Federal Bank, 2016).....	124
Figure 23: Distribution of employees in the German banking sector (Federal Association of German Banks, 2017)	125
Figure 24: The service matrix by Schmenner (2004): positioning banking services	127
Figure 25: positioning of banking services (Silvestro, 1999).....	128
Figure 26: Challenges for service management (adopted from (Brandon-Jones et al., 2016; Schmenner, 1986)).....	129
Figure 27: Conceptual Framework.....	132
Figure 28: Sequential mixed-methods methodology.....	147
Figure 29: Methodological triangulation.....	152
Figure 30: Hierarchy of strategic targets	168
Figure 31: purposes of the PES - case study.....	170
Figure 32: performance process - case study.....	171
Figure 33: data summary sheet TS1 "acquisition"	181
Figure 34: Procedure for sensitivity analysis.....	194
Figure 35: Performance Evaluation Sheet for employee no. 6 (excerpt).....	203
Figure 36: acquisition-consultancy portfolio.....	205
Figure 37: Themes map.....	218
Figure 38: overall assessment in terms of to age	243
Figure 39: overall assessment in terms of work experience.....	244
Figure 40: overall assessment in terms of previous experience with performance appraisal.....	244
Figure 41: overall assessment in terms of gender.....	245

List of tables

Table 1: DEA approaches on individual or group level.....	44
Table 2: exemplary definitions of performance.....	52
Table 3: Performance Management approaches on individual level.....	69
Table 4: Summary of review of PM Approaches on individual level.....	80
Table 5: Studies on the linkage of HR practices and performance	83
Table 6: characteristics of legally sound PES (modified from (Malos, 1998; Smith, 2013)).....	110
Table 7: service definitions	115
Table 8: Applicability of IHIP characteristics to different types of services (C. Lovelock and Gummesson, 2004).....	118
Table 9: Comparison of four research paradigms (Guba and Lincoln, 1994b; Mertens, 2014; Saunders et al., 2012).....	139
Table 10: Priorities of survey for each group of stakeholders.....	154
Table 11: performance measures TS1.....	173
Table 12: performance measures TS2.....	174
Table 13: performance measures TS3.....	175
Table 14: performance measures TS 4.....	176
Table 15: performance measures TS5.....	177
Table 16: performance measure record sheet (measure "inhabitants").....	177
Table 17: performance measure record sheet (measure "Total active volume").....	178
Table 18: correlation matrix TS1 "acquisition".....	179
Table 19: TS2: correlation matrix TS2 "consultancy and sales".....	179
Table 20: correlation matrix TS3 "profitability".....	179
Table 21: correlation matrix TS4 "bonuses".....	180
Table 22: correlation matrix TS5 "performance targets".....	180
Table 23: classification of Pearson's correlation coefficient r (Dancey and Reidy, 2007).....	180
Table 24: results for TS1 "acquisition".....	182
Table 25: results summary for TS1 "acquisition".....	183
Table 26: results for TS2 "consultancy and sales".....	184
Table 27: results summary for TS2 "consultancy and sales".....	184
Table 28: results for TS3 "profitability".....	185
Table 29: results summary for TS3 "profitability".....	185
Table 30: results for TS4 "bonuses".....	186
Table 31: results summary for TS4 "bonuses".....	186
Table 32: performance measures TS 4 (alternative 2).....	188
Table 33: excerpt of results of bonus calculation (alternative 1 and 2).....	189
Table 34: results for TS5 performance targets.....	190
Table 35: results summary for TS5 "performance targets".....	190
Table 36: projection of performance targets (extract).....	191
Table 37: sensitivity analysis - results summary TS 1 "acquisition".....	195
Table 38: Input-Output contribution employee no. 29 (TS1).....	195
Table 39: sensitivity analysis - results summary TS 2 "consultancy and sales".....	197
Table 40: Overview results TS1 - TS5 after sensitivity analysis.....	199
Table 41: summary results TS1 - TS5 after sensitivity analysis.....	199
Table 42: correlation analysis of results TS1 - TS5.....	200
Table 43: three-dimensional view of strategic fields.....	207
Table 44: Sampling of the Focus Group Assessment.....	211
Table 45: socio-demographic characteristics of respondents.....	229
Table 46: Cronbach's alpha, Mean and SD for the questionnaire's sections.....	231
Table 47: Factor Analysis (pattern matrix) of introductory part.....	232

<i>Table 48: Introductory Questions (questions 1 to 8) - Frequency distribution in per cent</i>	233
<i>Table 49: Part A – general requirements (questions A 1.1. to A 1.5.: measuring performance) - Frequency distribution in per cent</i>	234
<i>Table 50: Part B –administrative and developmental purpose (questions B 2.1. to B 2.4.) - Frequency distribution in per cent</i>	235
<i>Table 51: Part C – Comparison to other methods (question C 3.1.: measuring performance) - Frequency distribution in per cent</i>	236
<i>Table 52: Part D – Overall assessment (question D 4.1.: general suitability) - Frequency distribution in per cent</i>	236
<i>Table 53: Part D – Overall assessment (question D 4.2.: recommendation) - Frequency distribution in per cent</i>	237
<i>Table 54: regression analysis model A (methods ability to meet requirements for measuring performance * overall suitability for measuring performance)</i>	240
<i>Table 55: regression analysis model D (administrative and developmental purposes * overall suitability for measuring performance)</i>	241
<i>Table 56: regression analysis importance of the feature “calculating bonuses * overall suitability for the purpose of calculating bonuses</i>	241
<i>Table 57: Chi square analysis biographical data * overall suitability for measuring performance</i>	242