

CONTENTS

Preface xi
Acknowledgements xiii

01 Understanding HR analytics 1

Predictive HR analytics defined 3
Understanding the need (and business case) for mastering and utilizing
predictive HR analytic techniques 4
Human capital data storage and 'big (HR) data' manipulation 5
Predictors, prediction and predictive modelling 6
Current state of HR analytic capabilities and professional or academic
training 7
Business applications of modelling 9
HR analytics and HR people strategy 10
Becoming a persuasive HR function 10
References 11
Further reading 12

02 HR information systems and data 13

Information sources 14
Analysis software options 16
Using SPSS 19
Preparing the data 25
Big data 57
References 60

03 Analysis strategies 61

From descriptive reports to predictive analytics 61
Statistical significance 63
Examples of key HR analytic metrics/measures often used by analytics
teams 65
Data integrity 68
Types of data 68
Categorical variable types 69
Continuous variable types 71
Using group/team-level or individual-level data 72
Dependent variables and independent variables 73
Your toolkit: types of statistical tests 75
Statistical tests for categorical data (binary, nominal, ordinal) 82

Statistical tests for continuous/interval-level data 97
Factor analysis and reliability analysis 115
What you will need 118
Summary 119
References 119

04 Case study 1: Diversity analytics 120

Equality, diversity and inclusion 120
Approaches to measuring and managing D&I 121
Example 1: gender and job grade analysis using frequency tables and chi square 123
Example 2a: exploring ethnic diversity across teams using descriptive statistics 134
Example 2b: comparing ethnicity and gender across two functions in an organization using the independent samples t-test 140
Example 3: using multiple linear regression to model and predict ethnic diversity variation across teams 147
Testing the impact of diversity: interacting diversity categories in predictive modelling 155
A final note 155
References 156

05 Case study 2: Employee attitude surveys – engagement and workforce perceptions 157

What is employee engagement? 158
How do we measure employee engagement? 160
Interrogating the measures 162
Conceptual explanation of factor analysis 166
Example 1: two constructs – exploratory factor analysis 171
Reliability analysis 178
Example 2: reliability analysis on a four-item engagement scale 179
Example 3: reliability and factor testing with group-level engagement data 182
Analysis and outcomes 187
Example 4: using the independent samples t-test to determine differences in engagement levels 189
Example 5: using multiple regression to predict team-level engagement 196
Actions and business context 201
References 201

06 Case study 3: Predicting employee turnover 203

Employee turnover and why it is such an important part of HR management information 203
Descriptive turnover analysis as a day-to-day activity 205
Measuring turnover at individual or team level 205

Exploring differences in both individual and team-level turnover	206
Example 1a: using frequency tables to explore regional differences in staff turnover	207
Example 1b: using chi-square analysis to explore regional differences in individual staff turnover	211
Example 2: using one-way ANOVA to analyse team-level turnover by country	216
Example 3: predicting individual turnover	230
Example 4: comparing expected length of service for men vs women using the Kaplan-Meier survival analysis technique	239
Example 5: predicting team turnover	248
Modelling the costs of turnover and the business case for action	252
Summary	256
References	257

07 Case study 4: Predicting employee performance 258

What can we measure to indicate performance?	259
What methods might we use?	260
Practical examples using multiple linear regression to predict performance	261
Example 1a: using multiple linear regression to predict customer loyalty in a financial services organization	262
Example 1b: using multiple linear regression to predict customer reinvestment in a financial services organization	267
Example 2: using multiple linear regression to predict customer loyalty	270
Example 3: using multiple linear regression to predict individual performance	274
Example 4: using stepwise multiple linear regression to model performance	278
Example 5: using stepwise multiple linear regression to model change in performance over time	286
Example 6: using multiple regression to predict sickness absence	289
Example 7: exploring patterns in performance linked to employee profile data	294
Example 8: exploring patterns in supermarket checkout scan rates linked to employee demographic data	300
Example 9: determining the presence or otherwise of high-performing age groups	300
Ethical considerations caveat in performance data analysis	305
Considering the possible range of performance analytic models	306
References	307

08 Case study 5: Recruitment and selection analytics 308

Reliability and validity of selection methods	309
Human bias in recruitment selection	310
Example 1: consistency of gender and BAME proportions in the applicant pool	310

Contents

Example 2: investigating the influence of gender and BAME on shortlisting and offers made	313
Validating selection techniques as predictors of performance	325
Example 3: predicting performance from selection data using multiple linear regression	330
Example 4: predicting turnover from selection data – validating selection techniques by predicting turnover	333
Further considerations	340
Reference	341

09 Case study 6: Monitoring the impact of interventions 342

Tracking the impact of interventions	342
Example 1: stress before and after intervention	348
Example 2: stress before and after intervention by gender	352
Example 3: value-change initiative	359
Example 4: value-change initiative by department	367
Example 5: supermarket checkout training intervention	375
Example 6: supermarket checkout training course – Redux	383
Evidence-based practice and responsible investment	387
Reference	388

10 Business applications: Scenario modelling and business cases 389

Predictive modelling scenarios	390
Example 1: customer reinvestment	390
Example 2: modelling the potential impact of a training programme	397
Obtaining individual values for the outcomes of our predictive models	406
Example 3: predicting the likelihood of leaving	407
Making graduate selection decisions with evidence obtained from previous performance data	414
Example 4: constructing the business case for investment in an induction day	418
Example 5: using predictive models to help make a selection decision in graduate recruitment	422
Example 6: which candidate might be a ‘flight risk’?	431
Further consideration on the use of evidence-based recommendations in selection	435
References	435

11 More advanced HR analytic techniques 436

Mediation processes	438
Moderation and interaction analysis	440
Multi-level linear modelling	445

Curvilinear relationships	447
Structural equation models	450
Growth models	451
Latent class analysis	454
Response surface methodology and polynomial regression analysis	455
The SPSS syntax interface	459
<i>Machine learning</i>	460
References	467

12 Reflection on HR analytics: Usage, ethics and limitations 469

HR analytics as a scientific discipline	469
The metric becomes the behaviour driver: Institutionalized Metric-Oriented Behaviour (IMOB)	471
Balanced scorecard of metrics	473
What is the analytic sample?	474
The missing group	476
The missing factor	476
Carving time and space to be rigorous and thorough	477
Be sceptical and interrogate the results	478
The importance of quality data and measures	479
<i>Taking ethical considerations seriously</i>	479
Ethical standards for the HR analytics team	484
The General Data Protection Regulation (GDPR)	485
The metric and the data are linked to human beings	492
References	493

Appendix R 495

Index 510

Supporting resources to accompany this book are available at the following URL.

www.koganpage.com/PHRA2