

# FUNDAMENTALS OF HR ANALYTICS

## PRAISE FOR FUNDAMENTALS OF HR ANALYTICS

*Fundamentals of HR Analytics should be required reading for all HR Practitioners attempting to create value for their organisations, as well as to improve their own capabilities to gain insights in today's constantly changing world of work.*

*'In God we trust, all others must bring data' is largely attributed to Deming and a good starting point for acknowledging that analytics has a place in all professional work. Past Examples of Six Sigma projects in HR have demonstrated the leverage this can provide in supporting organisational improvement. It is thus fitting that a more dedicated book be available to HR practitioners that takes into account the specific lexicon and context of the HR function, as well as the contemporary trends and technological advances available.*

*While this book is an important contribution to professionals regardless of their level of expertise, it is an equally powerful contribution to deepening the common understanding of effective HR practices. As HR functions support necessary business improvement processes, their own maturity of moving from Basic Personnel Administration through to People Development, Line Management Empowerment, Value Addition and finally Anticipating the Future, will also require an overlay in HR Analytics Maturity as described in this book.*

— Dr Dino Petrarolo, SVP at Competitive Capabilities  
International and Best Practice Advisor

*HR is at a major intersection whereby the future success of organizations will be reserved for those who are capable of best understanding people data and how such information can be leveraged to disrupt and grow. There is a continued need for HR leaders to understand business, not just people. This book dives in deep to what every high-performing HR leader needs*

*to know about the incredible value than comes from a data-driven people-focused organization. Absorb what is in this book and deliver more value today by incorporating Fundamentals of HR Analytics into your everyday work life!*

— Scott Cawood, President and CEO of  
WorldatWork, USA

*What a great book! Business leaders look to HR for business solutions but are often disappointed. This book provides invaluable tools for HR practitioners to migrate from support to impactful business partners who deliver solutions that are bought into by senior leadership. I wholeheartedly recommend this book for all who are grappling with how to capitalise on the power offered by digital transformation and HR analytics to add greater value to their organisations. This book is written in an easy to understand format with many practical examples and case studies to illustrate the use of analytics to solve challenging problems that are commonplace in organisations.*

— Mark Cotterrell, Chairman and CEO of MAC  
Consulting, South Africa

*As a seasoned HR practitioner and academic, I found Fundamentals of HR Analytics a worthwhile read. Whether you are just about to start your HR analytics journey or are wanting to secure HR's seat in the boardroom, this is a must-have and must-read book! The authors successfully present a comprehensive summary of the perplexing people analytics 'mystery', so I will surely be recommending this book to my students and colleagues.*

— Magda Bezuidenhout, PhD, Senior Lecturer in  
Compensation Management, University of South Africa

*Arguably the biggest skill gap as the HR profession transforms in the digital age is in people analytics.*

*How can HR provide better visibility on an organisation's most important asset – its people. Where are the best opportunities to maximise ROI on human capital? Which events matter most to the employee experience? What predictive insights are possible to better enable workplace learning and agility? This book is therefore highly recommended as a must-read for both new and seasoned professionals. By enabling faster and better decisions, analytics will finally allow HR to re-claim its essence – to be more human.*

— Mayank Parekh, Chief Executive Officer at the Institute for Human Resource Professionals, Singapore

*It is an era of the Fourth Industrial Revolution and Big Data. It is fundamental that HR should remain relevant and aligned to the business objectives. This comprehensive analysis of HR drivers is essential and dynamic reading for all senior managers. It forms the basis for innovative decision-making and provides hands-on explanations with real-life case studies – from concept to implementation, in a context of global competition and added value for all stakeholders. Fundamentals of HR Analytics should be required reading not only for HR professionals but also for senior managers.*

— James Allan, CEO of Sable Metals & Minerals, South Africa

*Fundamentals of HR Analytics is a must-read for any HR professional who wants to understand and apply data analytics to solve real HR challenges in organizations. This book offers practical guidance and demystifies analytics with clear step-by-step guidelines to develop data-driven, realistic and actionable solutions to the common problems around talent attraction, development, retention and engagement.*

— Aileen Tan, Group Chief HR Officer, SingTel, Singapore

# FUNDAMENTALS OF HR ANALYTICS

A Manual on Becoming HR Analytical

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# FOREWORD

INFORMATION RICH, INSIGHT POOR. The digital transformation has been happening in HR for some time. With that transformation has been a tremendous increase in the accessibility of HR data. With so much data, HR professionals are faced with how to consume these data. As a function we are not putting the data to work for us to help us improve our organisation. This book, written by Dr Fermin Diez, Dr Mark Bussin and Venessa Lee, provides you the tools to make sense of all of this disparate information so you can make better HR business decisions.

I have had the pleasure to work with Fermin Diez in multiple consultancies over the past 25 years. Both of us have been highly aligned in terms of our passion for making better business decisions in the HR department through more fact-based analysis. We have seen data accessibility with easier to use tools grow exponentially and permitted us to work on projects that were able to measure success of an HR program or how a particular change in an HR program can deliver positive results for the company. As for the overall HR function, the ways to analyse the robust data sets have been left many times in the hands of consultants. This is changing. As HR strategies continue to better align with the business strategy, the requirement for basic and advanced HR analytics has increased. With the combination of Fermin's, Mark's and Venessa's consulting background and corporate experience, they bring a more practical approach to HR analytics in this book which people can quickly adopt and implement on their own.

In my 35 years of leading businesses that specialise in data, technology and insights, I have seen the growing need for upgrading the business acumen of the HR department (and even co-founded a course of Business Acumen for the HR Professional through the

World@Work association). HR analytics is key to upgrading your business acumen. We see techniques that have been used on the sales side (from client acquisition factors to customer retention analysis) for a long time to apply these same techniques to the human capital of an organisation. By applying these techniques, you can improve the results of the organisation. Since human capital is usually the largest expense in your company, and since we really know the least about it, you can apply these techniques outlined in this book to make significant differences in your company. Huge opportunities exist in HR to gain advantages and insights by improving your company through HR analytics. Here are some first-hand experiences:

- Analytics identified how a high potential management program in a large manufacturing company was causing negative impacts to the company. The basis was that these high potential managers were moving on to the next roles too early and were not seeing their changes through completion. In other words, a high potential would get into a role, want to make changes to prove themselves, make the changes, but then started looking for their next role. This program was causing changes after changes in processes with no follow-through, which impacted productivity in a negative way.
- A large software company used analytics to provide a better measure on whether an expatriate assignment was determined to be successful based upon many factors. This company was growing in emerging markets and expatriation success was a key driver for their global success. Again, no one can measure someone's heart or mind, but based upon big data, a model could be developed on the probability of success for an expatriate move (as these moves are expensive!).
- Analytics determined that a company had the wrong balance of full-time and contingent workers. The company thought a strategy of having more cost-effective contingent workers was the right strategy. Unfortunately, the analytics highlighted how customer service degraded and impacted the company in a

negative way. The analytics used were able to identify a more optimal balance of full-time employees and contingent workers.

These are just some of many types of analytics that utilise the tools that you will learn in the book and can apply them TODAY! As you read this book, remember the following:

**1. It's easy!**

With so much information at your fingertips, there are excellent measures that can quickly be produced which can have immediate success in sharing with colleagues or the business. Many books in this area are highly technical and lack the practical nature of what is demonstrated in this book. In the past, the best word to describe data in HR was 'helter-skelter' because data were in different, completely unrelated systems. With digital transformation, many of these data sets are being brought together so that analysis can be performed on all of the data at one time as opposed to just pieces of the information. This provides easier and better analysis.

**2. The problem that you are trying to solve is your unique problem.**

Context is everything. With HR analytics, this is not any different. You have a different business strategy than other companies, therefore, your HR strategy to achieve that business strategy is unique to your organisation. There is no prescribed answer to HR analytics. However, you can learn the tools and apply them to your specific circumstance and deliver the unique solution that will be best for your organisation.

**3. It's not about the data but the actionable insights.**

This has been one of the major issues that HR professionals face: 'I have so much data, what do I do now?' As with any solution, you need to address a problem or hypothesis. Are there key success factors that relate to the HR strategy that will be used to implement the business strategy? Focus on those areas where there are clear issues for success. With this problem at hand, you begin the slow process of understanding what are the factors that impact the problems and make sure that you have

data that can be used in various ways, as outlined in the book, to help measure, explain or address the issue.

The best insights are those that you can take an action to address. Yes, it is great to understand trends. However, it is better if you understand the trends, then take an action that will improve it and, most importantly, measure the improvement!

#### **4. Predictive analytics and simulations are the best!**

In HR analytics, you have different measures that have difference strengths in understanding of the impact. You first start with anecdotal data. You hear from someone that this one person has an issue and then many want to generalise that to everyone then having a similar issue. This is the weakest measure. Using turnover as an example, you always hear that this key staff person left the company because base salaries at our organisation are low. Is this the real reason why the person left? As we know, pay is an important element but there are many other factors that drive turnover.

Next type of measure, you have reality checks. This begins a more fact-based examination. You go to make sure you have the outcome that you were thinking the action would have. In our turnover example, you might check the pay relative to others in the organisation with similar skill sets to assess their pay.

Next, you have the ongoing reports. These are helpful, but are simplistic, since they are standard reports. They provide a baseline of information. You can line these ongoing reports together to produce some trends over time. This might be as simple as a headcount report and showing any joiners or leavers from each department.

As we continue to strengthen our measurement power, the next level is benchmarks. How does this one observation compare to others? This provides some context on the issue. A simple example is if your company has 10% turnover and your peer group has 20%. You can assume that you have less volatility in your staff, but do not know the answer to the question ‘why is your turnover lower?’

Correlation is the next level and provides greater strength in assessing the issue. In our turnover example, there are many



possible factors that can be the cause of turnover: pay relative to market, performance, growth opportunities, management, etc. With correlation measures, you can begin to assess how these factors correlate to turnover and which one might be more highly correlated with departures. However, correlation is not causation.

Up to now, these previous measures are looking at what has happened in the past (i.e. looking through the rear-view mirror). The strongest measures are prediction, causation and simulations. Since these techniques are more valuable, they can be leveraged to make more impactful decisions. These measures look through the windshield, that is, to the future. In our example of turnover, we can ask the question, who is most likely to leave the company? With the answer to this, you can make actions that will address these at-risk employees in a proactive way.

#### 5. Make a difference

Business acumen is not reading this book and adding tools to your skills. It is about thinking differently as a business person and not in a traditional HR approach. One of the first things to do is focus on fact-based decision-making. You will get more support for your work if you provide the analytical backup that you will be able to carry out after reading this book. Ultimately, you will be able to make a positive difference to your organisation!

Read the book, enjoy it! You will upgrade your capabilities and immediately start to apply what you learn. As a practitioner, I plan to recommend this book as a baseline reading for HR analytics.

**Steve Brink**

*Chief Executive Officer, Associates for International  
Research, Inc. (AIRINC)*

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This book is dedicated to all our students, teaching assistants and colleagues, past and present, who inspire us to push further to make HR practices ever more accessible to the practitioners and their bosses.

We also want to acknowledge the following individuals for all their help in putting this book together: Alexis Saussinan (Merck), Kaj Peltonen and KJ Kim (Tableau), Richard Lee and David Hope (Workday), Eric Sandosham (Red & White Consulting Partners), CheeTung Leong & Dorothy Yiu (EngageRocket), Desmond Tan & Kelly Chua (DDI), Jacob Tan (Aon), and Samir Bedi (EY). Very special thanks to Sid Mehta (Mercer) for all his help in the early conception of the books and early drafts of the material. And to Louisa Lau for her support in the transcriptions of many hours of discussions.

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# INTRODUCTION

*If you torture the data long enough, it will confess!!*

— *Ronald Coase, Nobel Prize Winning Economist*

The future of the HR profession lies in analytics. No professional entering the field can expect to succeed in his or her career without a solid understanding and hands-on practice of analytical tools to help in making people decisions.

To implement their business strategies effectively, leaders must deal with people issues in a way that allows them to gain competitive advantage through people (Thomas, Smith, & Diez, 2013). The organisations that will win the ‘war for talent’ will be those which are better at identifying and keeping key talent, motivating high performance, developing and promoting staff and predicting future people needs accurately. HR professionals need analytics to address these challenges. For example, linking pay for performance has been a dogma of management, but recent research shows that most incentive plans do not produce the desired behaviour, and that pay, in fact, has little correlation to business results (Boudreau, 2010; Diez 2018).

To succeed in the business world, it is imperative that HR provide data-driven answers and insights on how to implement and execute strategy through the people in the organisation. The aim of this book is to arm individual practitioners with practical, hands-on approaches to connect HR policies and practices to business performance. Our objective is to make HR analytics possible for everyone, although some prior knowledge of basic statistics, managerial accounting and HR concepts are useful when reading this book.

We leverage on key statistics and finance concepts, such as ROI and people productivity. We also assume readers are familiar with common available tools (e.g. Workday, Tableau, Excel, etc.) to manage data and visualise outcomes. Throughout the book we discuss data collection, clean-up and warehousing; how to build descriptive and predictive models; and apply HR analytics skills and tools for workforce planning, recruitment, compensation, training, career planning and turnover analysis.

More specifically, by the time readers finish reading this book, they should be able to:

1. Review key statistical and finance/accounting concepts in a way that is useful for HR analytics. These include measures of profit (EBIT, EBITDA, Net Profit), measures of financial return (ROI, ROE, ROA), measures of efficiency (cost, labour productivity) and descriptive/predictive statistics (regressions, correlations, z-scores).
2. Understand basic HR analytics concepts such as data-analytic thinking, data management and modelling. This will allow readers to go beyond the best practices or the benchmark data that HR and its business clients have been relying on to design programs and policies. Using data-analytic thinking and applying it on your own company's data will uncover unique insights that will provide your organisation a competitive edge that the conventional best practices or benchmark data fail to offer.
3. Understand how data are to be collected, prepared for analysis and stored so they can be used with the various commonly found tools.
4. Model HR analytics questions on workforce planning, recruiting, training, career planning, pay and turnover rates.

Our emphasis is in developing the readers' abilities to sell their solutions to the business, and not only understanding of the existing problems through evidence-based management.

## How this Book is Organised

In the first four chapters of the book we focus on the basics of HR analytics: Data-analytic thinking, tools, data management and modelling. Once readers have a basic understanding of analytics, we move – in the second part of the book – to the application of these techniques to specific HR problems. Note that we go from simpler analytics to more complex and use a variety of HR issues to illustrate different types of analysis that can be done. Of course, once readers are familiar with various concepts, they can apply them to different HR issues. For instance, we illustrate the use of simple regressions in the chapter about turnover. And we look at multiple regressions when looking at recruiting. But, of course, either concept can be applied to both these HR problems.

Following are the chapter topics and some comments about the broad objectives of each.

### Part I: The Basics of HR Analytics

#### Chapter 1: Basics of Finance and Statistics and Data-analytic Thinking

In this chapter, we review concepts with which you should be familiar, but we cast them in an HR light. These include potential variables of interest such as measures of profit (EBIT, EBITDA, Net Profit), measures of financial return (ROI, ROE, ROA) and measures of efficiency (cost, labour productivity). We also review concepts related to descriptive/predictive statistics (regressions, correlations, z-scores). Finally, we cover the principles of data-analytic thinking, including clustering, text analytics, network science and classification and regression.

#### Chapter 2: Tools for HR Analytics

The objective of this chapter is to have a look at what popular and easy-to-use tools for HR analytics can do.

#### Chapter 3: Data Collection, Clean-up and Warehousing

This chapter is about understanding data and how to use them. We discuss structured (internal) data, big data (external), and how to

ensure the validity, reliability and generalisability of data for consistency and clarity. We will also talk about storing of data, so it can be consolidated and accessed.

#### Chapter 4: HR Analytics Modelling

We cover two main ideas in this chapter:

1. Developing and testing hypotheses and models
2. Data analytical thinking

## Part II: Applications

#### Chapter 5: Turnover

Turnover is where most HR analytics programs are focused in practice. We look at a simple, yet powerful, way to address this issue.

#### Chapter 6: Training and Development

This section considers the important, but elusive, concept of the ROI of training.

#### Chapter 7: Workforce Planning

Accurately predicting how many employees are needed, with which characteristics and by when, is a source of competitive advantage. We explore how this is done.

#### Chapter 8: Recruiting

Attracting staff is an essential task of HR. The objective of this chapter is to examine what it takes to 'hire' successful employees, in terms of quality, longevity and fit.

#### Chapter 9: Pay Plans

Pay is the traditional 'data-driven' area of HR. We explore how HR analytics can be used to ascertain the perceived value of benefit programs.

#### Chapter 10: Career Planning

In this chapter, we illustrate the importance of setting career tracks and how analytics can be used to support this important HR process.



Chapter 11: HR Policies vs Profit

This chapter brings to light the links between HR policies and company profitability.

Chapter 12: Where to Next?

To conclude, we point readers towards ways to improve their HR analytics skills and additional tools to consider.