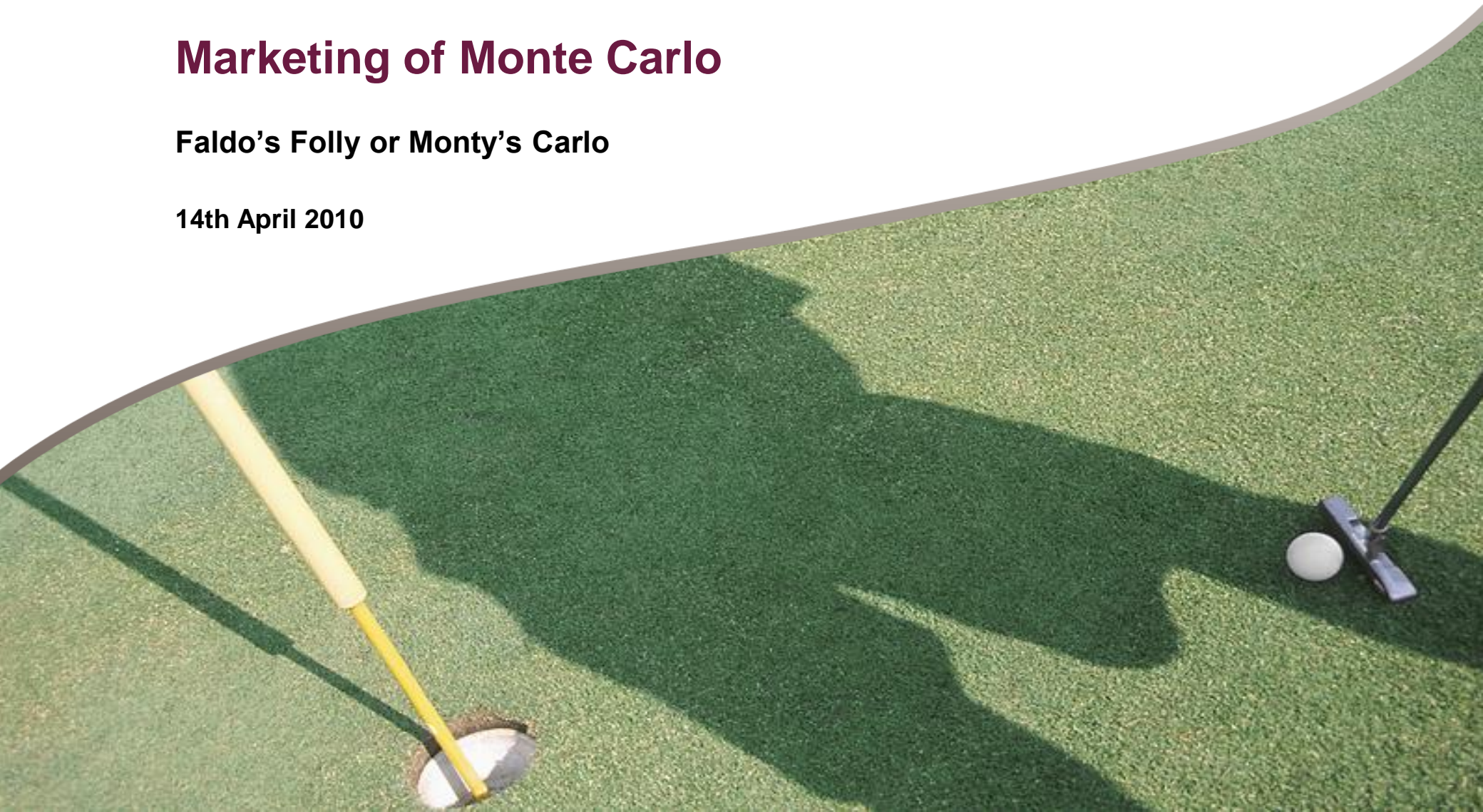


Marketing of Monte Carlo

Faldo's Folly or Monty's Carlo

14th April 2010



Contents

- **Monte Carlo at Capgemini Consulting**

- Faldo's Folly or Monty's Carlo
- Figure It Out Blog
- Green, Gold and Red Knights

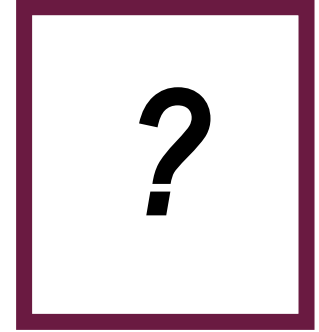
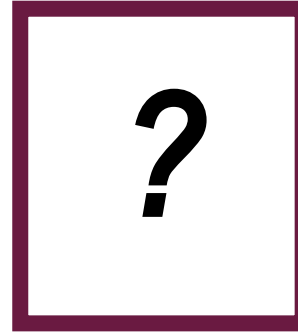
Introductions...



Stefan Sadnicki

**Senior Consultant
Operational Research
Capgemini Consulting**

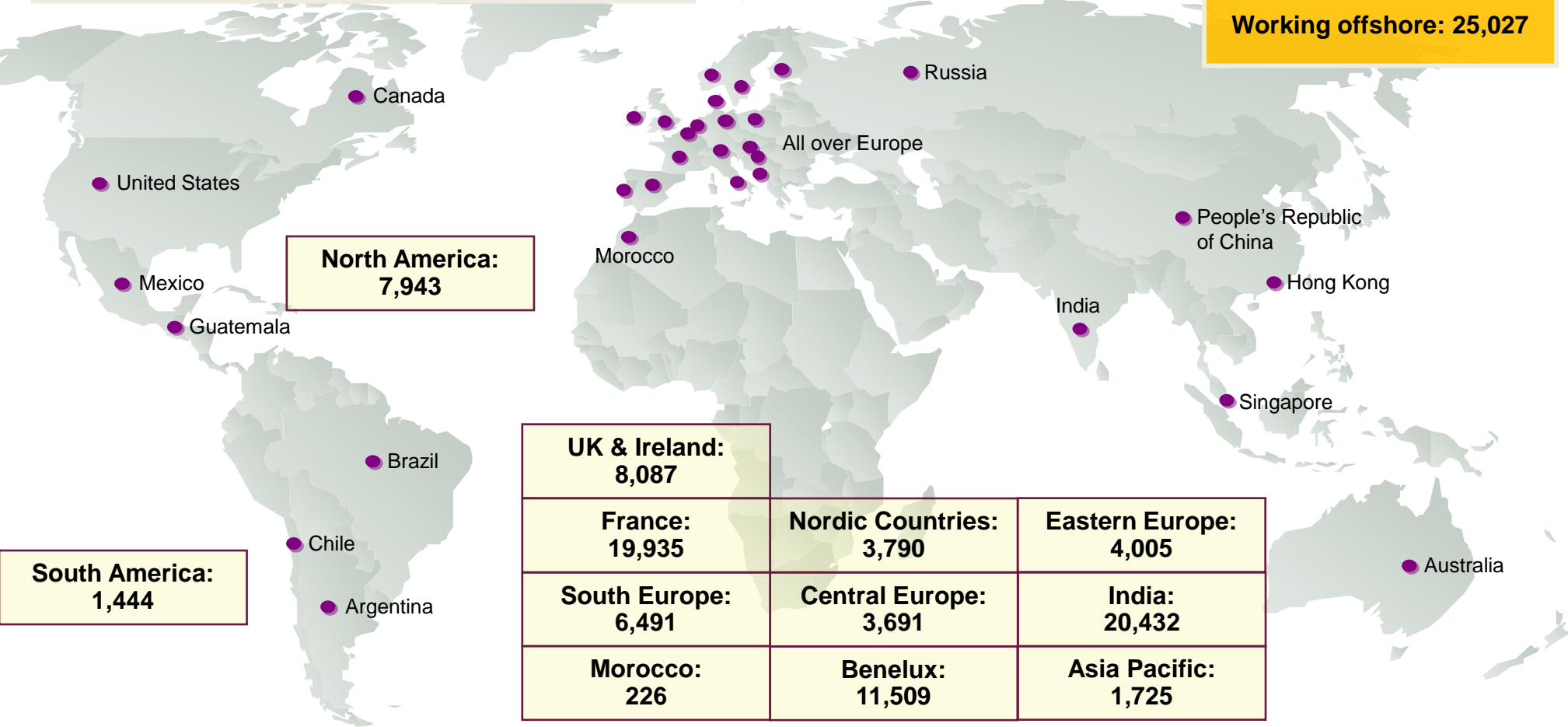
- Recent projects include:
 - Network Distribution Study with French Retail Bank
 - Financial Forecasting for NHS Hospital
 - Systems Dynamics modelling with the Ministry of Justice
- BA in Mathematics and an MSc. in Computer Science and University of Oxford.
- PGC in OR from the University of Strathclyde



Capgemini is one of the top international consultancies with a strong presence in more than 30 countries

Group Revenue €4,376 million

Group Workforce: 89,278
Working offshore: 25,027



Group Headquarters: Paris, France

64% of Fortune Global 500 as clients

as of June 30, 2009



Within the Capgemini Group, Risk Analysis is carried out by the specialist Operational Research (OR) team within Capgemini Consulting

Improving investment decisions, maximising delivery of benefits and increasing understanding of the drivers of business performance

- SAFER

Optimising operational effectiveness and efficiency of business operations, processes and workforce

- Information intelligence
- Forecasting back office workload
- Fact-based performance improvement
- NHS service redesign



Understanding and quantifying risk exposure and developing effective strategies for minimising the impact on the business

- Business resilience planning
- Managing risk in large transformation programmes

Understand and quantify the impact of alternative business options, economic assumptions and industry scenarios

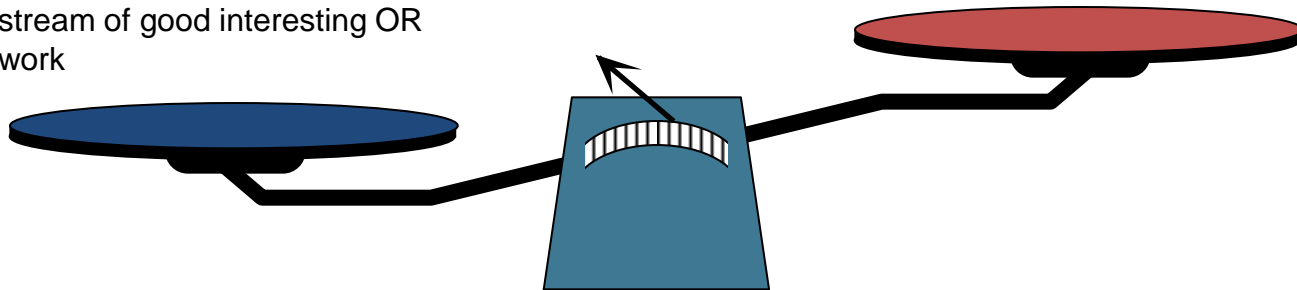
- Business games
- Policy modelling
- Health strategy modelling

Working as an OR Consultant within a large management consultancy has both positive and negative aspects...

- An OR group within a large management consultancy will be made up of individuals equipped with a comprehensive toolkit of OR techniques together with softer consulting skills.

- Our capabilities are quite distinct from colleagues elsewhere in the organisation.
- Our group is always in demand and there is a steady stream of good interesting OR work

- Our peers sometimes struggle to understand our capabilities
- Our work is not always recognised by client senior management. We solve the problem but others get the credit



We have to stop people thinking we just build colourful dashboards in Excel

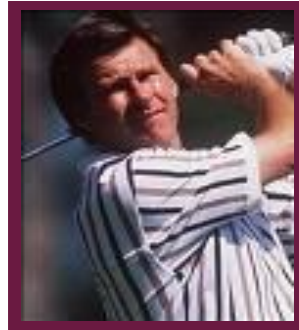
So how do we market ourselves both internally and externally to promote our capabilities (e.g. Monte Carlo Simulation)?



Stefan Sadnicki

**Senior Consultant
Operational Research
Capgemini**

- Recent projects include:
 - Network Distribution Study with French Retail Bank
 - Financial Forecasting for NHS Hospital
 - Systems Dynamics modelling with the Ministry of Justice
- BA in Mathematics and an MSc. in Computer Science and University of Oxford.
- PGC in OR from the University of Strathclyde



Sir Nick Faldo

**Captain 2008
European Ryder Cup Team**

- Won 6 Majors
- Knighted in 2009
- Left School at 15



**Colin 'Monty'
Montgomerie**

**Captain 2010
European Ryder Cup Team**

- Eight Order of Merit Titles
- 31 Tour Titles
- Never won a major
- Famous for his playing performances at the Ryder Cup



Malcolm Glazer

**Owner
Manchester United FC**

- Inherited his father's wholesale jewellery business
- Also owns Tampabay Buccaneers

Contents

- Monte Carlo at Capgemini Consulting
- **Faldo's Folly or Monty's Carlo**
- Figure it Out Blog
- Green, Gold and Red Knights

The scheduling of Ryder Cup singles matches can be used to demonstrate the potential of Monte Carlo simulation...



37TH RYDER CUP TEAM EUROPE

SEPTEMBER 16-21, 2008 | VALHALLA GOLF CLUB, LOUISVILLE, KENTUCKY, U.S.A.

Days 1 and 2: 4 foursomes and 4 fourball matches between pairs of European and pairs of American golfers (16 points)

Final day: All 12 players take part in singles matches (12 points)

The team with the highest overall points out of 28 matches wins. (If the competition finishes 14-14 the previous winners retain the cup)

Going into the final day's single matches the US were leading 9 points to 7. To retain the Cup, Europe needed 7 points from 12 matches

On the eve of the final day, the team captains are required to submit their team slate for the final 12 singles matches

- Each match consists of the same 18 holes in the same order and so the matches are staggered
- The earlier matches typically finish first

Should the strongest players be sent out first?

Should the strongest players be saved for last?

Should the best players be scheduled for the critical matches?

If the Americans are going to front-load their slate then what is the best European strategy?

Faldo's strategy was heavily criticised in the sporting press

Sport > Ryder Cup 2008

No regrets for Faldo after Ryder Cup gamble backfires

Montgomerie joins attack on Faldo's folly

By James Corrigan at The Belfry
Thursday, 25 September 2008

Ryder Cup 2008 will be remembered for the Americans burning passion and Faldo's desperate blundering

Montgomerie yesterday blamed Nick Faldo for Europe's Ryder Cup defeat - and refused to express any sympathy for the beaten captain.

Graeme McDowell also admitted Faldo got "the wrong line-up" in the singles at Valhalla as his side suffered their biggest defeat since 1981.

Ryder Cup: Americans seal win as Nick Faldo's singles gamble backfires

Captain Nick Faldo failed in his quest to lead Europe to Ryder Cup glory

Game Theory - the best a captain can do is pick names out of a hat

- To illustrate, suppose there were just two matches on the final day and Europe are required to win both matches to win the cup. Both Europe and the USA have a very good player, α and a good player, β and depending on the selection order matches can either be between equally ranked players or be mismatches:

		US	
		Very Good, α	Good, β
Europe	Very Good, α	$\frac{1}{2}$	p
	Good, β	$1-p$	$\frac{1}{2}$

- Selection order leads to the following pay-off matrix:

		US	
		(α, β)	(β, α)
Europe	(α, β)	$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$	$p(1-p)$
	(β, α)	$(1-p)p$	$\frac{1}{4}$

- $p(1-p)$ is always less than $\frac{1}{4}$ for $p > \frac{1}{2}$. European team stands a better chance of winning both matches if they have the same strategy

Optimal mixed strategy is to select (α, β) with a probability $\frac{1}{2}$ and (β, α) with a probability $\frac{1}{2}$. This is equivalent to picking names out of a hat.

The game theory result is based on two key assumptions?

Assumption 1

The captain has no reliable information about what the other side will do.

Assumption 2

The captain has no reliable information about how his players will react under pressure. By this we mean that a golfer's performance is unaffected by whether his match is the first of the day or one of the later matches that determines the Ryder Cup.

An improvement on the optimal game theory results only exists if one of the above assumptions is invalid.

It was widely reported that the US were going to front-load their line up so Faldo could use this information to influence his team selection

Assumption 1

The captain has no reliable information about what the other side will do.



What would you have done?

- Anthony Kim (5)
- Hunter Mahan (7)
- Justin Leonard (3)
- Phil Mickelson (1)
- Kenny Perry (6)
- Boo Weekley (9)
- J.B. Holmes (11)
- Jim Furyk (2)
- Steward Cink (4)
- Steve Stricker (8)
- Ben Curtis (12)
- Chad Campbell (10)

Ian Poulter (3)

Lee Westwood (5)

Oliver Wilson (9)

Sergio Garcia (2)

Soren Hansen (12)

Paul Cassey (11)

Justin Rose (6)

Graeme McDowell (10)

Robert Karlsson (7)

Henrik Stenson (4)

Padraig Harrington (1)

Miguel Angel Jimenez (8)

Also, when the pressure is on, some players are more likely to raise their games whilst others will crumble

Assumption 2

The captain also has no reliable information about how his players will react under pressure.



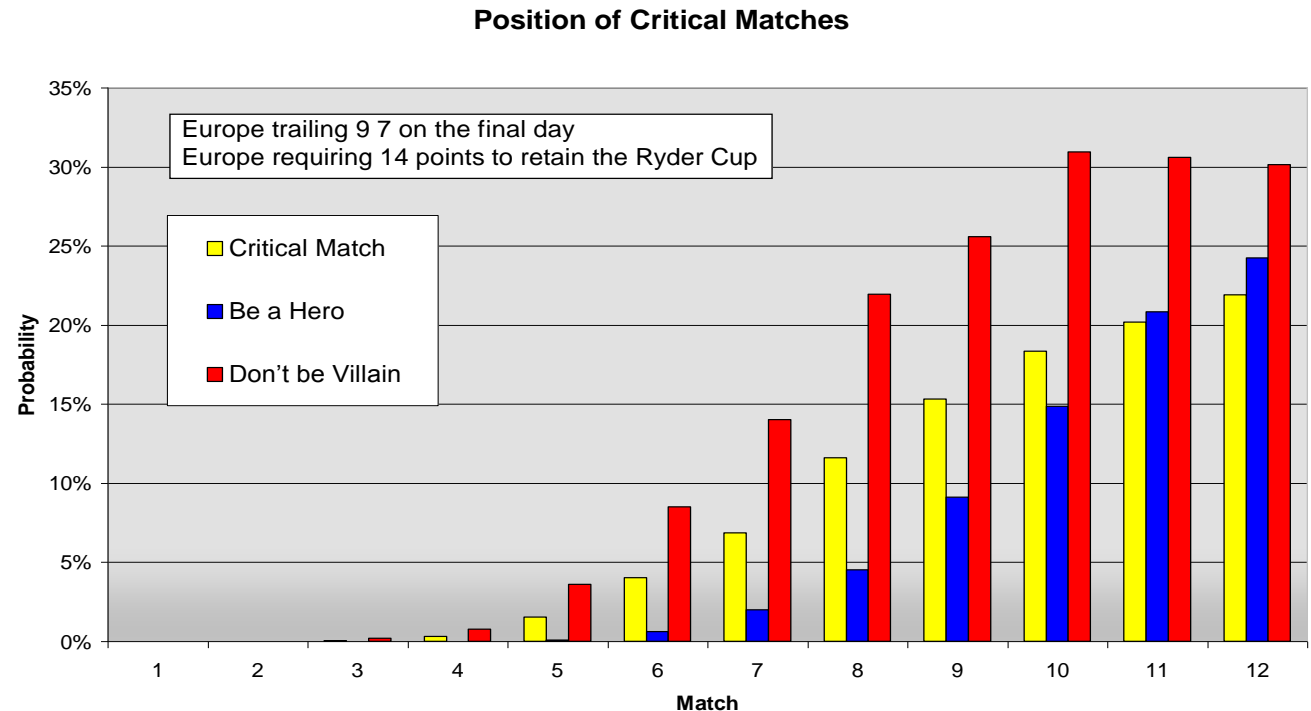
- Suppose two players perform better if they have the chance to be the hero and two players are able to hold their nerve and avoid becoming the villain.
 - Be a hero (if winning a hole will win the match and the Ryder cup)
 - Be a villain (if losing a hole will concede the Ryder cup)

- **Where would you place these players?**

You would want your 'pressure players' to play the critical holes – when the Ryder Cup will be either won or lost

A Monte Carlo simulation was used to determine the position of the critical matches.

- Towards the end of the day and on the back nine, a European player can:
 - Be a hero (if winning a hole will win the match and the Ryder cup)
 - Be a villain (if losing a hole will concede the Ryder cup)
- A match is critical if a player can be either a hero or villain on the same hole



Contents

- Monte Carlo at Capgemini Consulting
- Faldo's Folly or Monty's Carlo
- **Figure it Out Blog**
- Green, Gold and Red Knights

The success of the Ryder Cup analysis led to creation of a weekly Operational Research blog



Figure It Out

Statistical Skewness wins the Election

Following the election being called on Tuesday, we were unable to resist the opportunity to delve into some electoral statistics.

[Read more...](#)

[Digg this](#) | [Seed Newsvine](#) | [Permanent link](#) | Posted by Jonathan Chadwick on April 9, 2010 in [Politics](#) | [Comments \(0\)](#)

Strike Strategies

Following news today, that planned strike action by rail workers on the four days after Easter weekend has been called off at the last minute after a court injunction, commuters throughout the UK will no doubt be breathing a sigh of relief. Although the rail companies will share in that relief, there will have been quite a bit of work done behind closed doors this week preparing for the planned action. In this week's Figure It Out, we've considered the decisions that companies have to make when faced with strike action and some of the strategies they employ.

[Read more...](#)

[Digg this](#) | [Seed Newsvine](#) | [Permanent link](#) | Posted by Peter Roseman on April 1, 2010 in [Business & Operations](#) | [Comments \(0\)](#)

world

Capgemini's Operational Research team - using maths to save the world!

[About the authors](#)

[Suggest a new topic](#)

SUBSCRIBE

 [RSS news feed](#)

[What is a RSS feed?](#)

 [Add to Technorati Favorites](#)

RECENT POSTS

[Statistical Skewness wins the Election](#)

[Strike Strategies](#)

[Greased Lightning?](#)

If you want to write a guest contribution for the blog please feel free to get in touch.

Contents

- Monte Carlo at Capgemini Consulting
- Faldo's Folly or Monty's Carlo
- Figure it Out Blog
- **Green, Gold and Red Knights**

In recent months a consortium of business men 'The Red Knights' have been discussing a bid for Manchester United Football Club.



The Red Knights proposed bid has generated lots of publicity... with each report quoting different statistics...

[Home](#) > [Sport](#) > [Football](#) > [Premier League](#)

Red Knights: 'We can save United – if fans pay £2,500 each'

Consortium makes offer to supporters but admits its plan to buy out the Glazer family is far from simple

By Ian Herbert and Nick Harris

Wednesday, 3 March 2010

SHARE | PRINT | EMAIL

As many as 100,000 Manchester United fans will be asked to contribute £2,500 each to the Red Knight fund to buy out the club from the Glazer family, under initial costings drawn up by those leading the audacious pr



United's £1bn Super Knights: Two wealthy fans bid to force out Glazers

By JOE BERNSTEIN Last updated at 12:54 AM on 21st March 2010

Comments (0) | Add to My Stories

Two Manchester United 'Super Knights' are prepared to put in £500million each to force the Glazer family out of Old Trafford. However, the Red Knights, who are trying to buy the club from the Glazers, are likely to reject the offer as they build a consortium of 40 people putting in £15m each. So far, the Red Knights - led by lifelong United fan Jim O'Neill, the chief economist at global investment banking and securities firm Goldman Sachs - have 60 potential investors.

Comment is free

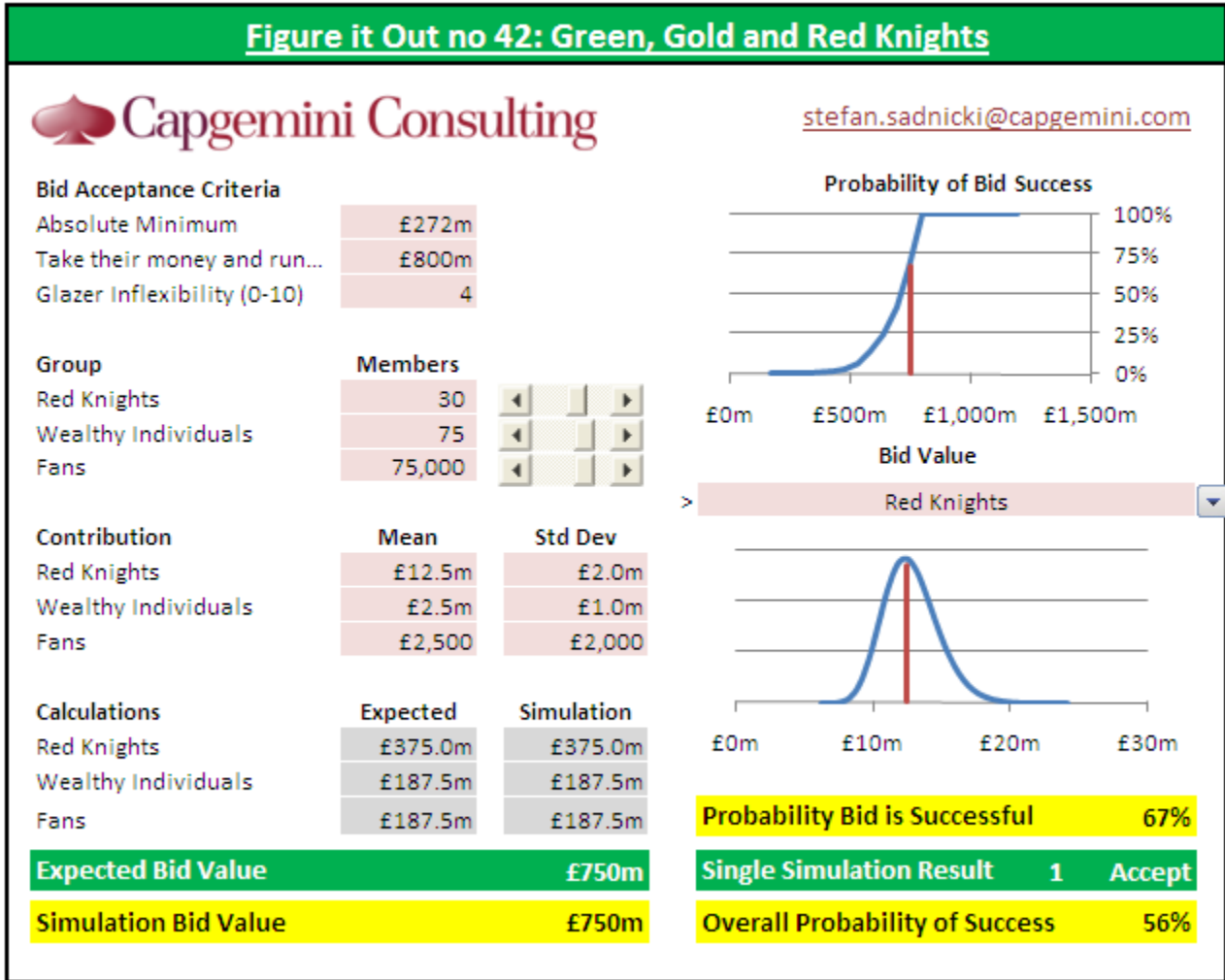
This United goal is green and gold

May the Red Knights oust the Glazers. But this campaign should encourage fans to demand real collective ownership

But the Red Knights want evidence of more commitment before they will pledge cash support to the tune of around £10m-£15m each from the 40-50 wealthy backers.

There are understood to have been 40 serious expressions of interest in investment from would-be Red Knights, though initial proposals discussed by O'Neill and the Manchester United Supporters' Trust (Must) are understood to envisage 50 high net-worth individuals, each contributing between £10m and £15m each, raising at least £500m; a further 100 throwing in between £1m and £5m each, raising a further £200m based on their investment being £2m each and – most challenging of all – the £2,500 contribution from fans.

We put took all of these different sources and came up with a model



Further Information

■ Our 'Figure it Out' Blog

- updated every week

<http://www.uk.capgemini.com/orblog/>

- Faldo's Folly or Monty's Carlo – OR Insight

http://www.uk.capgemini.com/orblog/2009/11/queen_acts_on_or_analysis.php

- Green, Gold, and Red Knights

http://www.uk.capgemini.com/orblog/2010/03/green_gold_and_red_knights.php

■ The Operational Team also has

- 200 success stories:

http://www.uk.capgemini.com/services/consulting/or/success_stories/

- and over 30 demo models:

<http://www.uk.capgemini.com/services/consulting/or/demos/>

■ For more information please contact:

Stefan Sadnicki: (+44) 870 195 1354

(+33) 6 29 30 96 30

Stefan.Sadnicki@capgemini.com

Original Article

Faldo's folly or Monty's Carlo

Stefan Sadnicki* and Shilpa Shah

Capgemini Consulting, 76–88 Wardour Street, London W1F 0UU, UK.
E-mail: Stefan.Sadnicki@capgemini.co.uk

*Corresponding author.

Abstract The Ryder Cup is arguably the most prestigious and most exciting golf tournament in the World. It is a team event contested once every 2 years between 12 golfers from Europe and 12 golfers from the United States of America. For the 12 singles matches on the final Sunday, each captain selects the order in which his players tee off. In 2008, after an eventual US victory, the sporting press was hugely critical of Nick Faldo's (the European captain) slate selection. This article looks to explore the justification of such criticism. First, existing academic results are reviewed and, where necessary, updated for 2008. Second, using Monte Carlo simulation, we consider the scheduling of players who react differently under pressure. This simple sporting example illustrates how Monte Carlo simulation can be used to analyse a range of potential scenarios enabling better, more informed decisions. Within a business context, where a winning outcome is essential, non-OR practitioners must understand how OR techniques can be used to make better, more informed decisions. This article concludes by discussing how the Ryder Cup model, together with a related example analysing interdependent project risks, was successfully used within a consultancy environment to introduce non-OR practitioners to the theory behind and the potential of Monte Carlo simulation. *OR Insight* (2009) 22, 185–200. doi:10.1057/ori.2009.8

Keywords: Monte Carlo simulation; consulting; the Ryder Cup; golf; OR in sport

Introduction

Within large management consultancies, an OR group will be made up of individuals with capabilities quite distinct from their colleagues elsewhere in the organisation. From the authors' experience, good OR consultants are equipped with a comprehensive toolkit of OR techniques together with softer consulting

© 2009 Operational Research Society Ltd 0953-9548 *OR Insight* Vol. 22, 4, 185-200
www.palgrave-journals.com/ori/

Palisade Risk Conference – Stefan Sadnicki

Copyright © 2010 Capgemini. All rights reserved. 23



www.capgemini.com/consulting

Capgemini Consulting is the strategy and transformation consulting brand of Capgemini Group

Copyright © 2009 Capgemini. All rights reserved.