



***- World Class Sports Data & Intelligence -***

***Technology, Innovation and Olympics***



# Elo Methodology: Forecasting & Profiling

## How to rate the athletes and teams across all Olympic disciplines?

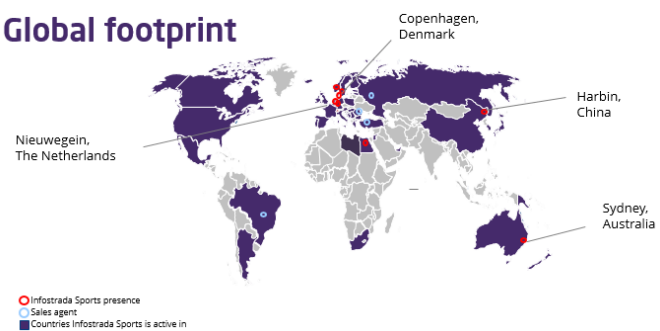
**28 August 2015 - 10:45 - 11:15 - 30 min. by Wouter Smak (AM)**

- Infostrada Sports – General overview
  - Database management
  - Question: Why Analytic services?
  - Deep dive – Elo Methodology: Forecasting & Profiling
  
  - Podium demo → Welcome to view!
-

## About INFOSTRADA SPORTS

- A leading international sports information company
- Producing data, information and intelligence
- One-of-a-kind sports database/over 250 sports
- Unmatched in its global and historical coverage
- Developing data-driven products and services
- Distributing /publishing content across multiple platforms
- Global base of international clients

### Global footprint



# Database Management

## Philosophy



# Database Management

## Principles

### Professional sports on a global level

- Invest in live coverage and historic depth
- High quality: consistent, reliable, accurate
- 24/7, 365 days a year

### Scalable

- Enter once, sell many
- Off-the-shelf products
- Standard delivery in 17 languages

### Address market needs

- Differentiated client base: Media, Federations, Event organizers, NOCs
  - Grow data package with clients' need
  - Facts & Figures spearhead to open up new markets
  - Current development: increase speed of data delivery (betting)
-

## Database Management Operations

### Main operational control from:

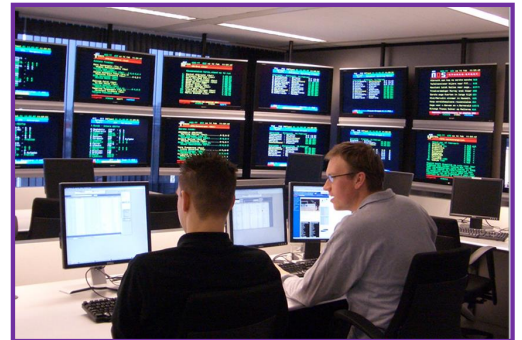
- Nieuwegein (08:00 CET – 24:00 CET)
- Harbin (24:00 CET – 17:00 CET)

**Our clients can reach us 24/7, and we respond**

### Data collection hubs around the world:

- Harbin
- Copenhagen
- Cairo
- Koblenz
- Sydney, Melbourne

Bio research in locations around the world



# Database Representation



## Products & Services

### DATA SERVICES

- ▶ 250+ sports covered worldwide
- ▶ Athlete biographies
- ▶ 400+ football competitions
- ▶ Multiple sports rankings
- ▶ Live and historical results

### MEDIA SERVICES

- ▶ Preview, Review & Live Services
- ▶ Facts & Figures Services
- ▶ Prep Kits & Event Guides
- ▶ All Sports Q&A Service
- ▶ 24/7 Online SportsDesk

### ANALYTIC SERVICES

- ▶ Podium, the Performance Manager
- ▶ Benchmarking and Evaluation
- ▶ High Performance Analysis
- ▶ Forecasting and Talent Trajectories
- ▶ Monitoring Teams and Athletes

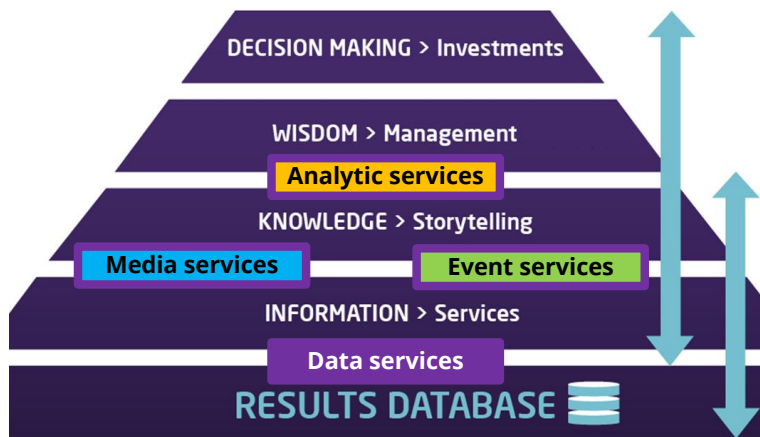
### EVENT SERVICES

- ▶ Consultancy and Support
- ▶ Media INFO Systems
- ▶ Pre-event Information
- ▶ Press Operations
- ▶ Games News Services





## Why Analytic Services?

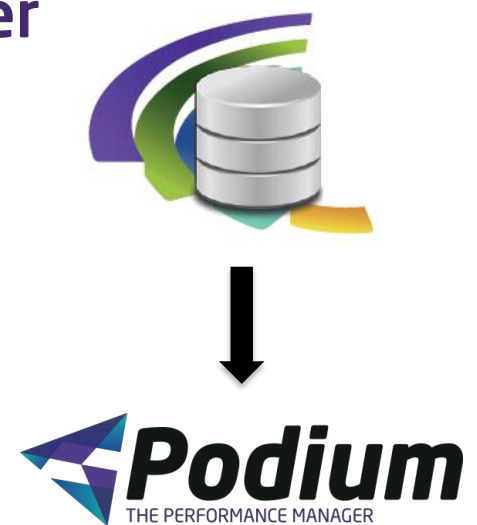


**NOCs/NGBs**  
ask for  
**Information**  
and  
**Knowledge**  
that leads to  
**Wisdom**  
and to make better  
**Decisions**

## Podium, the Performance Manager

(Online) solution for collection, presentation, and analysis of results and rankings, updated twice a day.

- **Monitoring system** - Keep track of all results and rankings on elite and junior levels
- **Communication support** - Extract information to communicate information internally and externally
- **Analytics support** - Use predefined analyses or extract data to Excel for deeper analysis.
- **Decision support** - Support higher management policy making and funding decisions.



# Overview



Standard and/or Plus

- Data packages:
- Olympic
  - Youth
  - Paralympic
  - Non-Olympic



Customisation & Integration



Forecasting

Rank	NOC	G	S	B	Total	Market Share	G	Total
1	Russia	13	11	9	33	11.91%		
2	Norway	11	5	10	26	9.33%	1	1
3	Canada	10	10	5	25	9.23%	1	1
4	United States	9	7	12	28	9.14%	2	2
5	Netherlands	8	7	9	24	8.03%		
6	Germany	8	6	5	19	7.02%		
7	Austria	4	8	5	17	5.56%	2	2
8	France	4	4	7	15	4.62%	2	2
9	Switzerland	6	3	2	11	4.52%	2	1
10	Sweden	2	7	6	15	4.16%	4	1
12	Belarus	5	0	1	6	2.99%	4	5

Storytelling & Evaluation

Virtual Medal Table

R	NOC	G	S	B	Total
1	USA	46	20	31	97
2	CHN	27	29	21	77
3	RUS	25	20	29	74
4	GER	19	11	19	49
5	FRA	17	13	15	45
6	AUS	14	17	12	43
7	NZL	10	6	2	18
8	GBR	9	16	1	26
9	GBR	8	17	21	46
10	KOR	8	10	6	24
11	HUN	8	4	2	14
12	JPN	6	13	25	44
13	NED	6	6	13	25
14	ESP	6	6	5	17

Last update: 02/06/2015



Public

## Podium Standard



- Data packages:
- Olympic
- Youth
- Paralympic
- Non-Olympic

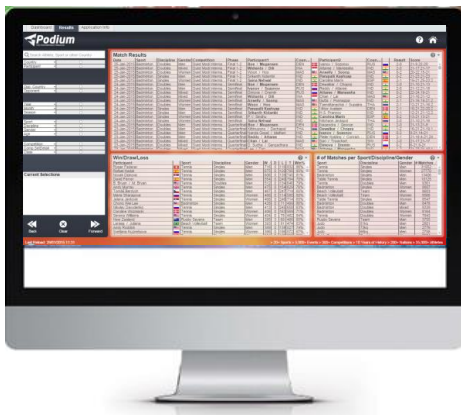
### Standard needs

**“I want to know how we are doing, compared to our competitors”**

**“I want to know which athletes are potential medal winners”**

- Extensive data → Export data
- Competitive analysis → bookmark & reports
- Talent identification
- Market share
- Calendar

## Podium Plus



Modules:

- Matches
- Deeper data
- Sports specific

### Plus needs

**"I want to know h2h stats about our athletes against their competitors"**

**"I want to analyse race strategies"**

- Extensive Matches data → Export data
- Phase data: Heats, Rounds, etc.
- Detailed data: Split times and Result info (Reaction time etc.)
- Sports specific: Integrates all levels of detail for one sport

## Podium Customization & Integration



### Customisation needs

**"I want to use my own metrics (and data) for high performance analysis"**

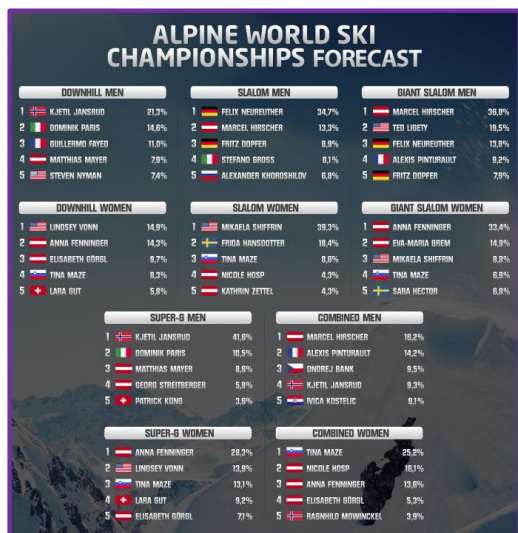
- Milestone event analysis
- Athlete tracking & profiling

### Integration needs

**"I want to know in what sports program I should invest"**

- Return on Investment
- Evaluation of training programs

# Forecasting



## Forecasting needs

**"I want to know if my athletes are on track winning a medal at the next Olympic Games."**

- Virtual Medal Table
- Client specific solution
- Funnels; Benchmarking
- Pathways
- Elo methodology

R	NOC	Gold	Silver	Bronze	Total
1	USA	46	20	33	99
2	CHN	31	27	14	72
3	RUS	22	24	29	75
4	GER	16	16	18	50
5	FRA	16	9	18	43
6	AUS	12	20	10	42
7	GBR	10	17	21	48
8	JPN	10	14	21	45
9	NZL	10	6	3	19
10	BRA	9	12	4	25
11	KOR	9	4	8	21
12	NED	8	5	10	23
13	HUN	7	4	4	15
14	ITA	6	7	15	28
15	KAZ	6	4	2	12

Last update: 05/08/2015

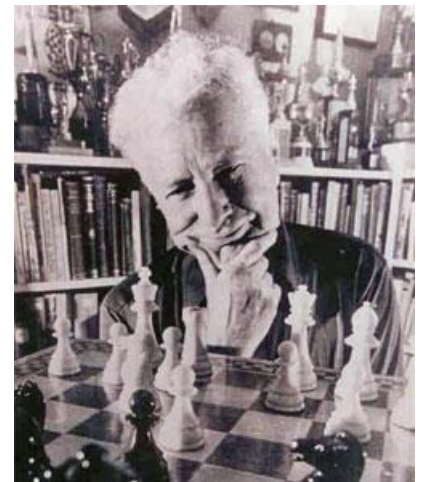


## Elo methodology

- Arpad Elo (1903-1992)  
“The increase or decrease in the rating is dependent on the actual result of a match compared to the expected result”

Sport types:

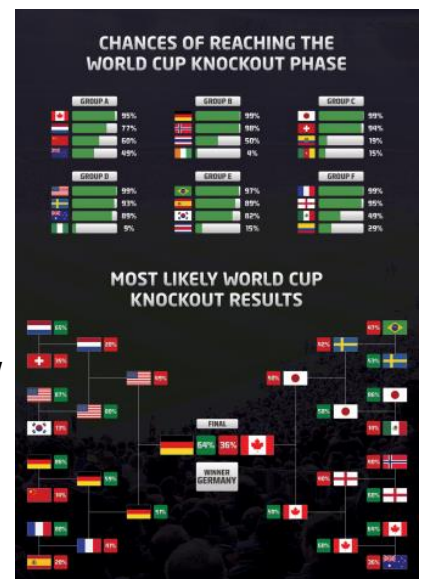
- Head-to-Head sports → Chess
- Team sports → FIFA Women’s World Ranking
- Time / Judge sports → ??



# Elo Rating System

## Create a ranking for every Olympic discipline

- Based on historical results since August 2004 (after Athens Olympic Games)
- Updated rating for every participant after each result to show current strength
- Gain points when winning and drop points when losing
- More points gained for beating stronger opponents



## Elo for multi-competitor competitions (1)

- Each athlete plays one match against the 'average opponent'
- The actual score is the percentile in which the athlete finished

We have a competition with 5 participants (say Athletics 100m)

Participant	Rating	Rank	Actual Score	Expected Score	Points?
Usain Bolt	2500	1	1	0.95	+
Justin Gatlin	2000	2	0.75	0.45	+
Nesta Carter	2300	3	0.5	0.75	-
Kemar Bailey-Cole	1800	4	0.25	0.35	-
Nickel Ashmeade	1500	5	0	0.1	-



## Elo for multi-competitor competitions (2)

### Model Extensions

- Specialty ratings

For athletics we have a combined sprint rating for Usain Bolt (consisting of 100m, 200m and 400m) and we have a specific rating for every single event.

- Competition factor

Based on the strength of the field we have a competition factor for every competition.

- Discount ratings

If you are not participating for a certain period of time your rating will decline gradually.



# Elo example: Standings (1)

Standings RankMoments Mutations Medal Forecast Rating Funnels Rank Funnels Compare

**Current Selections**

Sport Golf

Gender Men

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Sport Golf

Event Individual

Gender Men







Sport	Event	Gender	Rank	Participant	Age	NOC	TotalRating	Ev
Golf	Individual	Men	1	Jordan Spieth	22-020	USA	2523.800	:
Golf	Individual	Men	2	Henrik Stenson	39-133	SWE	2488.481	:
Golf	Individual	Men	3	Justin Rose	35-017	ENG	2482.767	:
Golf	Individual	Men	4	Rory McIlroy	26-104	NIR	2480.626	:
Golf	Individual	Men	5	Jim Furyk	45-096	USA	2476.862	:
Golf	Individual	Men	6	Matt Kuchar	37-056	USA	2467.357	:
Golf	Individual	Men	7	Bubba Watson	36-284	USA	2467.064	:
Golf	Individual	Men	8	Jason Day	27-277	AUS	2465.550	:
Golf	Individual	Men	9	Hideki Matsuyama	23-172	JPN	2462.301	:
Golf	Individual	Men	10	Brooks Koepka	25-105	USA	2447.657	:
Golf	Individual	Men	11	Patrick Reed	25-011	USA	2445.342	:
Golf	Individual	Men	12	Rickie Fowler	26-246	USA	2440.570	:
Golf	Individual	Men	13	Sergio Garcia	35-219	ESP	2438.017	:
Golf	Individual	Men	14	Dustin Johnson	31-055	USA	2436.083	:

## Elo example: Standings (2)

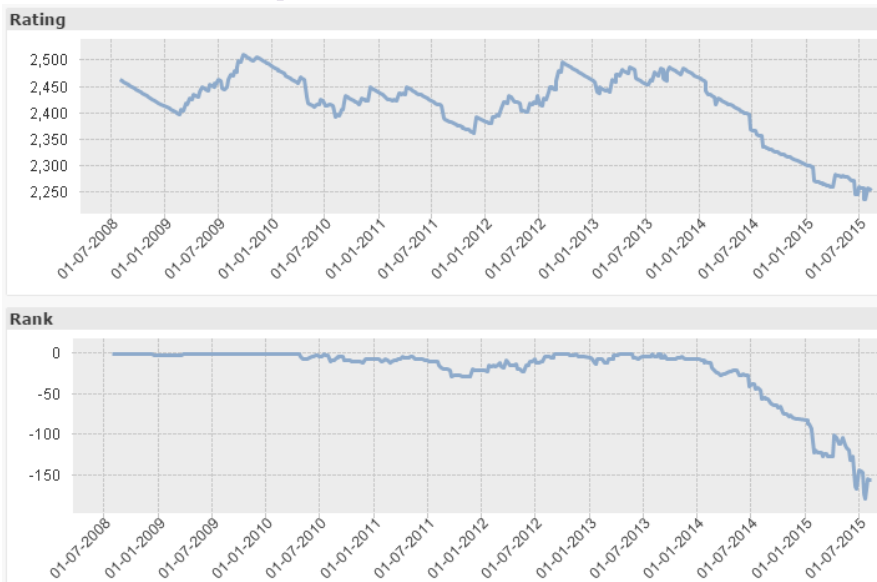
Current Selections				Standings									
Sport	Event	Gender	Participant	Sport	Event	Gender	Rank	Participant	Age	NOC	TotalRating	EventRating	SpecRating
⌵ Athletics	⌵ 200m	⌵ Women	8 of 30356	Athletics	200m	Women	2	Dafne Schippers	23-055	NED	2736.515	2524.764	2948.266
				Athletics	200m	Women	8	Jeneba Tarmoh	25-316	USA	2535.497	2404.495	2666.498
				Athletics	200m	Women	10	Veronica Campbell...	33-086	JAM	2466.093	2189.271	2742.915
				Athletics	200m	Women	11	Candyce McGrone	26-138	USA	2444.177	2392.017	2496.337
				Athletics	200m	Women	12	Sherone Simpson	30-362	JAM	2438.596	2360.366	2516.826
				Athletics	200m	Women	14	Dina Asher-Smith	19-248	GBR	2408.919	2265.659	2552.179
				Athletics	200m	Women	41	Ivet Lalova-Collio	31-083	BUL	2214.814	2095.319	2334.308
				Athletics	200m	Women	42	Elaine Thompson	23-042	JAM	2208.785	2208.785	2208.785

- Total Rating: Combination of event rating and Specialty rating
- Event Rating: 200m women only
- Specialty Rating: Sprint rating

## Elo example: Standings (2)

POS	BIB	ATHLETE	COUNTRY	MARK		200m	Sprint	Perf
1	622	Dafne SCHIPPERS	 NED	21.63	CR	• 1	1	
2	520	Elaine THOMPSON	 JAM	21.66	PB	• 6	8	+
3	508	Veronica CAMPBELL-BROWN	 JAM	21.97	SB	• 7	2	+
4	900	Candyce MCGRONE	 USA	22.01	PB	• 3	6	
5	383	Dina ASHER-SMITH	 GBR	22.07	NR	• 5	4	
6	921	Jeneba TARMOH	 USA	22.31		• 2	3	-
7	197	Ivet LALOVA-COLLIO	 BUL	22.41		• 8	7	-
8	518	Sherone SIMPSON	 JAM	22.50	SB	• 4	5	-









## Elo example: Rank moments



- Golf, Men
- Tiger Woods in decline

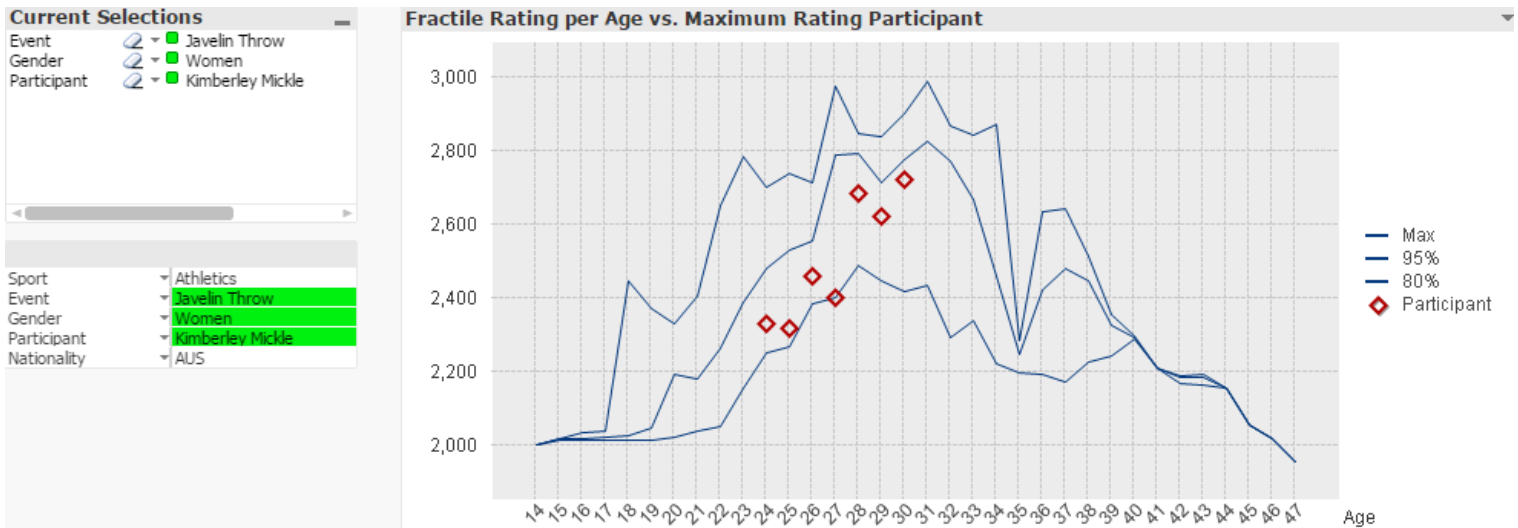


## Elo example: Mutations

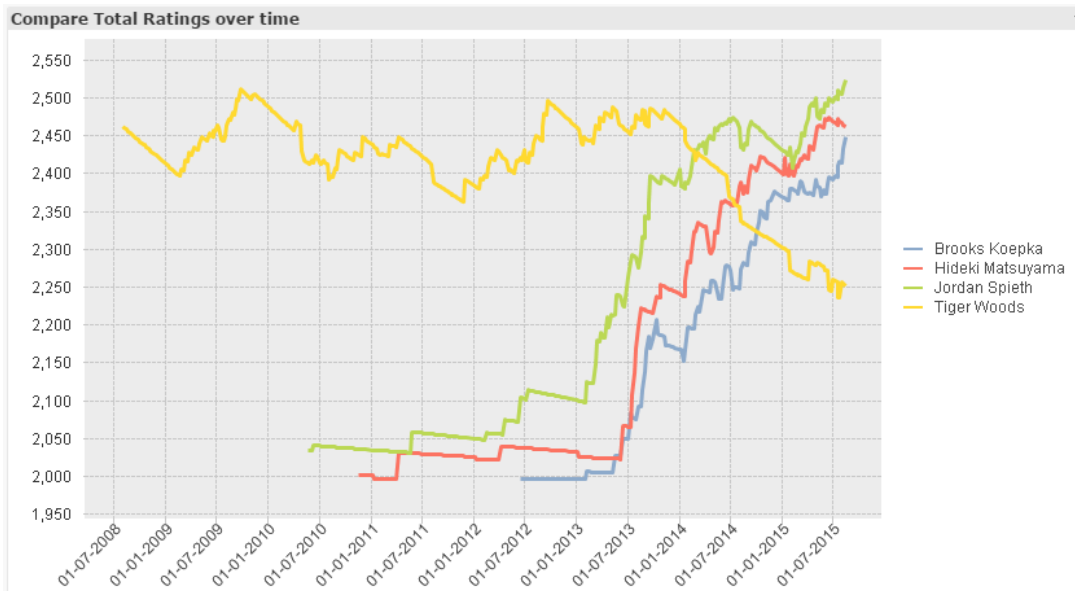
Mutations														
Sport	Event	Gender	Date	Competition	Rank	Participant	Age	NOC		AvgRating	RatingBefore	RatingAfter	Mutation	CF
Athletics	400m Hurdles	Men	2015-08-09	NACAC Championships	1	Javier Culson	31-015	PUR		2078.211	2575.274	2586.167	10.893	0.622
Athletics	400m Hurdles	Men	2015-07-23	Pan American Games	2	Javier Culson	30-363	PUR		2304.221	2565.817	2582.047	16.230	1.287
Athletics	400m Hurdles	Men	2015-07-09	Athletissima	4	Javier Culson	30-349	PUR		2381.675	2605.885	2571.291	-34.594	1.180
Athletics	400m Hurdles	Men	2015-06-13	Adidas Grand Prix	1	Javier Culson	30-323	PUR		2274.547	2566.759	2616.863	50.104	0.983
Athletics	400m Hurdles	Men	2015-06-04	Golden Gala	3	Javier Culson	30-314	PUR		2378.456	2570.486	2570.272	-0.214	1.320
Athletics	400m Hurdles	Men	2015-05-30	Prefontaine Classic	6	Javier Culson	30-309	PUR		2412.079	2656.538	2572.445	-84.094	1.034
Athletics	400m Hurdles	Men	2015-05-15	Doha	2	Javier Culson	30-294	PUR		2347.585	2663.908	2663.349	-0.559	1.170
Athletics	400m Hurdles	Men	2014-08-20	World Championships	3	Javier Culson	30-034	PUR		2536.888	2628.863	2627.635	-11.228	1.457

- 400m hurdles: Javier Culson (PUR) → Reached Semis at WCh2015
- Average rating: Average rating of event participants
- Competition factor: Top8 + algorithm

# Elo example: Rating funnels



# Elo example: Compare



## Forecasting results (1)

### Aggregated forecast results (WCh 2011, OG 2012, WCh 2013)

Measure	Correct	Total	Percentage
medal = medal	392	709	58.2%
medal = top8	581	709	82.9%
medal = top16	663	709	94.1%
top8 = top8	1230	1883	66.7%
top8 = top16	1638	1883	87.9%



## Forecasting results (2)

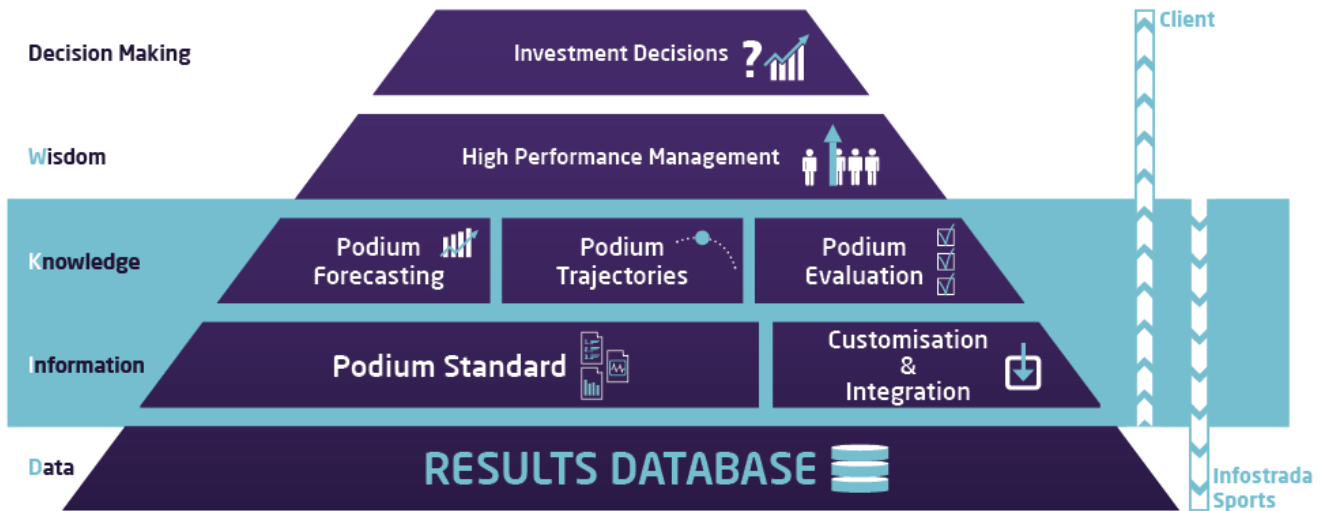
### Forecast WCh 2013 with ratings from 1 and 2 years before

Measure	WCh 2013	1 year before	2 years before
gold = gold	40.4%	34.0%	31.9%
gold = medal	83.0%	63.8%	53.2%
gold = top8	93.6%	93.6%	80.9%
gold = top16	95.7%	95.7%	91.5%
medal = medal	62.7%	47.9%	37.3%
medal = top8	85.2%	80.3%	63.4%
medal = top16	93.0%	90.1%	85.9%
top8 = top8	66.8%	61.5%	52.8%
top8 = top16	88.1%	83.3%	78.3%





### INFOSTRADA SPORTS ANALYTICS PYRAMID





**If you would like to know and see more?**

***Be welcome to view a Podium Demo and ask your questions***

