Management Ability Test

Predicting Business Success

For
Consultants
Business and
Financial Professionals

A Recruitment tool to Predict Business Success
Original Thinking Applied

The MAT[80] is a psychometric tool designed to aid the recruitment of individuals seeking a career in all aspects of business, management and finance.

Developed by E-Metrixx in partnership with the Psychometrics at Work Research group within Alliance Manchester Business School. The research group is headed by Paul Irwing, Professor of Psychometrics and Editor of the Wiley Handbook of Psychometrics.

The tool was piloted and developed between 2011-2015 with over 7,000 applicants to the Global and Executive MBA programmes offered by Alliance Manchester Business School through seven centres around the world: Manchester, Shanghai, Hong Kong, Sao Paulo, Singapore, Miami and Dubai.

The MBA programmes offered by Alliance Manchester Business School are practical, hands-on focused, and geared with a single-minded focus on business success. Candidates must have a minimum of 3 years professional experience showing strong career progression and management/leadership responsibilities.

To satisfy these criteria, the MAT[80] was developed to replace the GMAT (the standard used by most Business Schools). The MAT[80] had to be non-cheatable, and written for an international audience using scientific English as taught as a second language.

> *"Professor Paul Irwing, the co-creator of the MAT[80], gave a presentation to IDC on Thursday. It was fascinating to learn that MAT[80] is proving to be a better predictor than GMAT or GRE of a student's academic success on the MBA.*
>
> *A real example of Original Thinking Applied."*
>
> **Professor Elaine Ferneley**
> **Global and MBA Director Alliance Manchester Business School**

MAT80

Predicting Business Success

The MAT[80] was designed specifically to identify candidates with the potential to be 'High Earners' in a business career.

The test has 3 sections:

Business personality and problem solving (20 minutes)
Financial numeracy (20 minutes)
Business communication (20 minutes)

Candidates are advised that they must complete the test in one sitting and that the numeracy and written communication sections are timed.

The MAT[80] shows an overall
predictive validity of 0.55 to 0.63

The equivalent measures for the
GMAT are 0.37 to 0.47

Extract from Technical specification June 2016
Paul Irwing
Professor of Psychometrics, AMBS

Measuring Personality for Business Success

Assessing winning skills in business does not have to be left to subjective judgment. Personality scales developed for the MAT[80] are based on extensive analysis and validation of scales using Bartram's (2005) meta-analysis of 29 studies (N = 4,861) of the predictors of business success, as judged by managerial job performance.

Every psychometric item (question) has an average of 100 hours development, including language sensitivity testing for candidates with English as a second language, and confirmatory factor analysis to ensure the quality of the scales.

Order, Achievement, Leadership & Stress Resistance
Successful managers are well-organised, plan in advance with an ability to have an overall view, define achievable goals, take responsibility, and guide others are the most critical traits common to successful managers.

Assertiveness, Optimism, Curiosity & Intrinsic Motivation
Successful managers rely on their optimism to take on new challenges, and to inspire and motivate their colleagues. They engage with both the external world and their own internal thoughts. They demonstrate confidence in what they want and show determination, clear and honest communication in their drive to get it.

Problem Solving Creativity & Innovation
MAT[80] uses a number of core measures developed for *me[2] General Factor of Creativity*, the world's most advanced tool to assess and develop creative thinking in individuals.

> *"Organisations struggle to harness creativity and innovation due to a skills gap – they do not know how to develop and encourage creative thinking."*
>
> PwC Global CEO Survey 2012
>
> *"50% of revenue in 5 years time must come from sources that don't exist today, to achieve this, creativity is crucial."*
>
> Ernst & Young
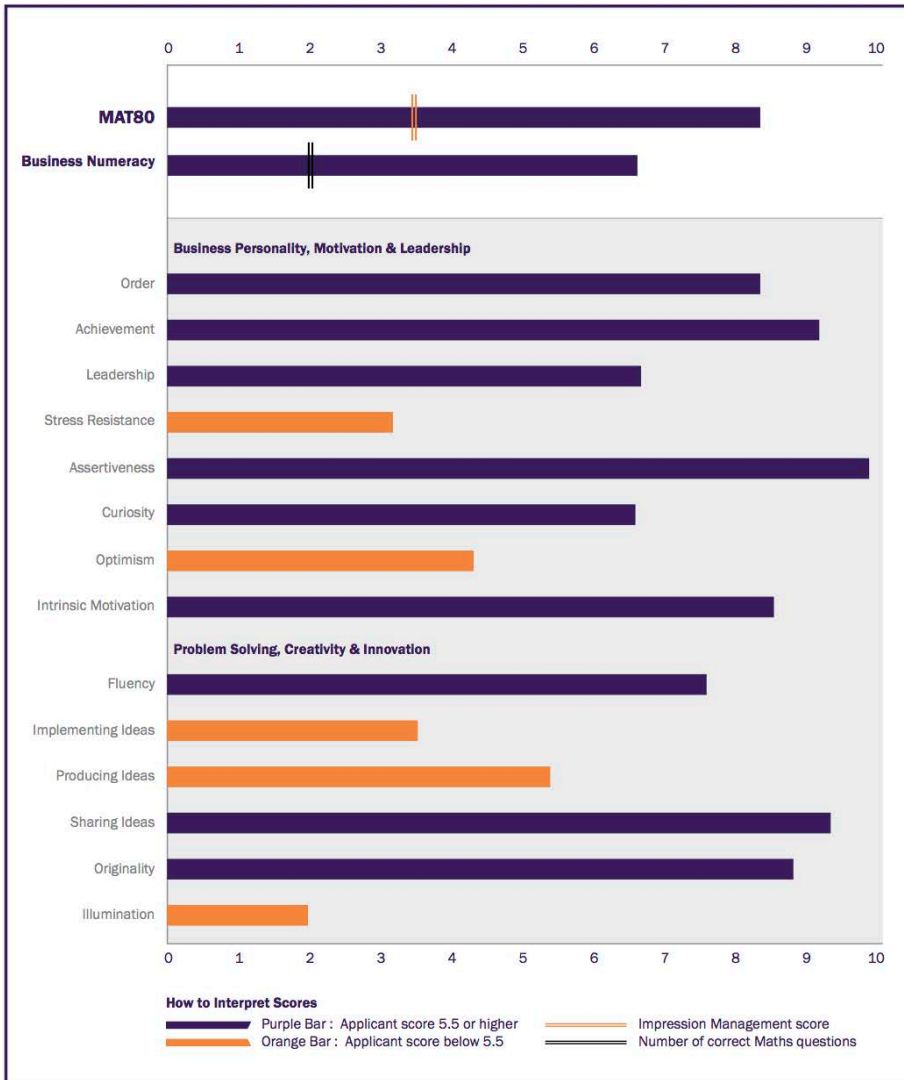> 'Connecting Innovation to Profit'

Overall Scores & Business Personality

MAT80

Applicant:	**Anne Example**	Organisation:	**National Health**
Completed:	**01.01.14**	Activity Code:	**Senior North**

MAT80
Business Numeracy

Business Personality, Motivation & Leadership

Order
Achievement
Leadership
Stress Resistance
Assertiveness
Curiosity
Optimism
Intrinsic Motivation

Problem Solving, Creativity & Innovation

Fluency
Implementing Ideas
Producing Ideas
Sharing Ideas
Originality
Illumination

How to Interpret Scores

- Purple Bar : Applicant score 5.5 or higher
- Orange Bar : Applicant score below 5.5
- Impression Management score
- Number of correct Maths questions

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5.5 has been set as an above average pass rate, at this level the score indicator bars change from orange to purple for easy scanning.

Reports are designed to allow for quick assessment. The overall scores show a weighted average for ability and personality, and the business success characteristics are listed in priority order.

MAT80

Business Numeracy

MAT80

Applicant: Anne Example
Completed: 1st January 2014

Organisation: National Health
Programme: Senior North

Business Numeracy

		Correct Answer	Applicant Answer	Score
1	A chocolate manufacturer has developed a new product. Each product costs them [n] to make and deliver. They add a profit of [n] onto the product. How much does a box of 24 products sell for?	76.44	76.44	1
2	A chocolate manufacturer has developed a new product. They sell each case of 24 products sells for [n]. This price includes [n] profit added to the manufacturing cost. How much profit do they earn on each box of 24 poducts?	222.67	222.67	1
3	A retail shop sells the product for [n] each. This price includes a sales tax of [n]. How much would the product sell for if the sales tax were removed?	72.51	72.51111	1
4	A retail shop sells the product for [n] each. This price includes sales tax of 20%. When the sales tax is removed, the shop makes a profit margin of [n]. How much does the retailer pay per product?	784.67	183.99	0
5	A shop sells [n] units of the chocolate products in a month at £0.79 each. After sales tax of 20% the shop makes an average profit margin of [n]. How much profit does the shop make?	458.67	458.668	1
6	A company has issued a total of [n] shares trading on the stock market. The shares are trading at [n] each. What is the stock market valuation of this company?	76,873,547,557	76,873,547,557	1
7	A company has issued a total of 100,000,000 shares trading at [n] each on the stock market. The company makes a post tax profit of [n]. What are the earnings per share expressed as a percentage of the share price?	64.37	64.37	1
8	A company has issued a total of 250,000,000 shares trading at [n] each on the stock market. The company pays a total dividend of [n]. What is the dividend per share expressed as a percentage of the share price?	75.00	86.79	0
9	A company has issued a total of 250,000,000 shares trading on the stock market. The company announces a profit after tax of [n]. The company pays a dividend per share of [n]. What percentage of the earned profit does the Company pay to shareholders?	11.77	22.77	0
10	A company has issued a total of 250,000,000 shares trading on the stock market. The shares are trading at [n] each. The company announces a profit after tax of [n]. What is the price earnings ratio of this company?	31.06	31.1	1

6/10

The Business Numeracy report shows the exact questions offered to the candidate (including their particular randomly chosen values), the correct answers and the answers inputted by the candidate.

The report allows you to understand where a candidate went wrong. There is also a colour code to show if the candidate was arithmetically correct but failed on one of the wider rules such as working to two decimal places.

Business Numeracy is a real test of ability. Ability (as tested by IQ tests) is regarded as the most critical driver of success, not just in one's career, but on almost every standard from life expectancy to happiness. The Business Numeracy section of the MAT[80] is both a substantial test of pure IQ delivered in the language of business and a measure of 'Applied Intelligence' tapping into business acumen.

Additionally, the Business Numeracy questions test wider, more important questions such as rule following, attention to detail and understanding business by numbers. The questions have been written in clear, unambiguous and internationally understandable language. The Business Numeracy test delivers over 10,000,000 different combinations to candidates by randomising certain values, making it impossible to cheat.

MAT80

Business Reasoning

MAT80

Applicant:	**Anne Example**	Organisation:	**National Health**
Completed:	**1st January 2014**	Programme:	**Senior North**

Business Subject :

Accounting Standards

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Notes:

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The 500 word essay is clearly presented and allows for very quick assessment by the Admissions Team. This section of the test provides an insight into the candidate's interest in business issues

The open-ended format of this section allows finer insight to discriminate between high-achieving candidates, and provides basis for discussion in an interview.

This section is not automatically scored in the way that the Personality and Business Numeracy sections are. However, a simple mark scheme assigning 0-4 marks for quality of writing, 0-4 marks for knowledge of subject, and 0-2 marks for spelling and grammar allows for rapid, yet effective, assessment of essays. This can be assessed after an initial evaluation based on the Personality and Numeracy questions to further shortlist candidates.

Using this scheme, the business reasoning section has been scored and analysed for a sample of 236 candidates, and showed a predictive validity of 0.66, compared to 0.55 for an equivalent analysis of the MAT[80] that excludes the business reasoning score.

MAT⁸⁰ Group Report

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MAT80

Organisation:	**National Health**
Activity Code:	**Senior North**
Report Date:	**01.01.14**

How to Interpret Scores

Purple Bar : Applicant score 5.5 or higher
Orange Bar : Applicant score below 5.5
Impression Management score

Applicant	D.O.B	0 1 2 3 4 5 6 7 8 9 10
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
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MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
MBA Applicant	01.01.14	
Applicants:		0 1 2 3 4 5 6 7 8 9 10
Total Applicants:		

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Recruitment teams can also download at any time group reports showing the overall score for up to 25 candidates per page. This allows recruiters to easily scan and select those candidates with stronger scores.

Manage Activities: From here you can see all the activities you have set up on MAT^{80}, allowing you to easily organise and find the candidates you are looking for.

Specific activity view: within each activity, you can see all candidates who have taken the test, and, if they have completed it, download their reports. The "Download all reports" button will download the full report, including interpretation, for each candidate. The "Download all profiles" button will download just the Overall Scores & Business Personality page for each candidate. The "Download data" button will download the Overall Scores & Business Personality data for all candidates in a single csv file for an easily manipulable dataset or easy comparison of large groups of candidates.

Technical Specification Highlights Page 1

The RMSEA and SRMR estimates demonstrate that all models estimated were a close fit to the data. Given that Semester 1 represents an outlier, arguably the best estimate of the overall validity of the MAT80 is based on the mean for semesters 2-5. The results of this analysis suggest that the overall validity of the MAT80 in predicting MBA students' marks in semesters 2-5 of their MBA programme is 0.42 once unreliability in the criterion has been accounted for.

Semester Marks	N	ρ	Prange res.
All	1,599	.393	.507
Semesters 2-5	1,599	.420	.552

Prediction of semester grades from MAT80 scores, corrected for unreliability in the criterion, and with a further correction for range restriction.

The most closely equivalent data for the GMAT is that for applicants who are non-native English speakers. The estimate of the overall validity of the MAT80 at 0.42 thus compares favorably to the equivalent GMAT estimate, which stands at 0.30. Importantly, however, the MAT80 also appears to enjoy a sizable advantage over the GMAT with respect to validity in English-speaking samples.

Group	N	Corrected for unreliability and range restriction
Native English Speaking	28,624	.470
Non-Native English Speaking	1,815	.374*

*Meta-analysis of GMAT validities. *Estimated.*

The scale reliabilities for each of the scales used in the MAT80 show a high reliability, as measured by McDonald's Omega. Also worthy of note is the low Standard Error of Measurement, giving a high degree of confidence in these high reliabilities.

Scale	N	Omega	M	SD	Skew	Kurtosis	SEM
Achievement	1400	0.78	5.00	2.00	0.00	-0.18	0.053
Assertiveness	1400	0.80	5.00	2.00	0.00	0.21	0.053
Curiosity	1400	0.83	5.00	2.00	0.00	-0.10	0.053
Intrinsic Motivation	1400	0.88	5.00	2.00	0.00	0.02	0.053
Leadership	3058	0.89	5.00	2.00	0.00	0.69	0.036
Optimism	1400	0.93	5.00	2.00	0.00	0.43	0.053
Order	1400	0.74	5.00	2.00	0.00	-0.25	0.053
Stress Resistance	1400	0.88	5.00	2.00	0.00	-0.26	0.053

Technical pecification Highlights page 2

Fluency	1400	0.87	5.00	2.00	0.00	-0.09	0.053
Illumination	1400	0.78	5.00	2.00	0.00	0.11	0.053
Implementing Ideas	1400	0.94	5.00	2.00	0.00	0.53	0.053
Originality	1146	0.72	5.00	2.00	0.00	0.38	0.053
Producing Ideas	1400	0.80	5.00	2.00	0.00	-0.15	0.053
Sharing Ideas	1400	0.85	5.00	2.00	0.00	0.14	0.053
Business Numeracy	1771	0.78	5.38	2.08	0.35	-0.97	0.051

Business personality and numeracy validity analyses

While the business reasoning section is not scored automatically, using a simple 10-point mark scheme one can quickly and effectively assess the essay, and increase the predictive validity of the overall test by approximately 0.11.

Predictor Scales	N	RMSEA	SRMR	ρ	Prange res.
MAT without essay	236	.065	.062	.469	.549
MAT with essay	236	.029	.042	.522	.658

Business reasoning validity analysis

A focus of the MAT80 has been invariance between cultures, especially those that do not speak English as a first language. The analyses show that this is the case, with the RMSEA indicating a close fit (<0.06).

Model	X^2	df	CFI	ΔCFI	RMSEA	ΔRMSEA	TLI
	Business Personality, Motivation and Leadership						
	White (N = 232) v. E. Asian (Chinese, N = 357)						
Configural	4115.9	2498	.931		.049		.918
Metric	4169.4	2539	.931	.000	.048	-.001	.920
Scalar	4359.9	2632	.927	-.004	.047	-.001	.922
	Problem Solving, Creativity and Innovation						
	White (N = 232) v. E. Asian (Chinese, N = 357)						
Configural	1572.4	781	.965		.059		.961
Metric	1627.0	805	.964	-.001	.059	.000	.961
Scalar	1704.8	858	.963	-.001	.058	-.001	.962

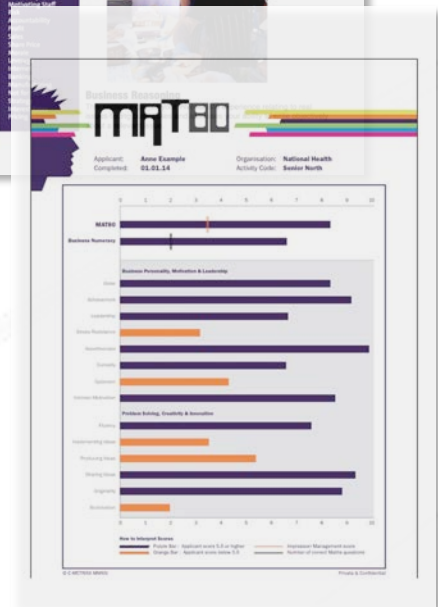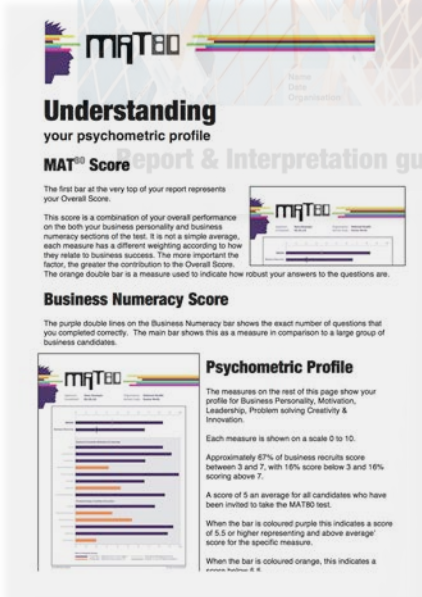*Fairness analysis for the psychometric section of MAT80*

Paul Irwing, Professor of Psychometrics
Editor of the Wiley Handbook of Psychometrics

Any questions contact **info@e-metrixx.com**

MAT80

Candidate Report and Interpretation

The 25-page candidate report and interpretation guide can be used for training and development with successful candidates.

Guide

Each report contains the same sections as the recruiter's report with full explanations to allow the candidate to see their scores. The interpretation provides positives and negatives for both high and low scores on each of the scales.

Pricing

Prices include all technical suport materials, unlimited data downloads and recruiter's and candidate reports. Licenses are provided based on an annual contract.

Pay Per Use	£84 per report
License for up to 1000 per annum	£tbc
License for up to 2500 per annum	£tbc
License for over 2500 per annum	£tbc

To set up an account, contact info@e-metrixx.com

Personalise Your Report

For annual license holders, reports can be personalised. Pricing depends on requirements and usage. All enquiries to info@e-metrixx.com.

Personalised Interpretation guide, online interface and report for Alliance Manchester Business School

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