**National College of Ireland**
**School of Business**

# Business Intelligence

Programme: MSc in Business Analytics for Decision Makers (MSCBADM1)

**Semester ONE Assessment: 2025 / 2026**

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Lecturer: Victor del Rosal, MSc

**CA percentage of overall grade for module:** 100%

**This CA requires a mandatory pass to complete this module:** **Yes**

| Repeat Strategy (please tick the relevant box) | Repeat CA | Repeat Exam |
|---|---|---|
| | X | |

# Assessment Overview

**Weight:** 80% of total module grade (remaining 20% from other coursework)

**Deliverable:** **TWO FILES** submitted via Moodle:

- **Single-page PDF/Word document** containing your GitHub Pages URL, screenshot, and abstract
- **Single HTML file** containing your complete BI dashboard project (all CSS/JS embedded, NO external files)

**Learning Outcomes Assessed:** LO1, LO2, LO3, LO4

# Project Mission

As a business analytics professional, you must learn to extract actionable insights from data to support strategic decision-making. In this project, you will select a real-world company (public or private), identify a critical business question, gather and Analyse relevant data, and present your findings through an interactive web-based Business Intelligence dashboard.

**Your challenge:** Use data analytics to address a real business challenge, understand market dynamics, or uncover opportunities for a specific company of your choosing.

# Project Requirements

## The Final Artifact: Your BI Intelligence Website

Your main project artifact is a **live, public-facing website** (hosted on GitHub Pages) that showcases your business intelligence findings for a specific company. This site should be professional enough to show potential employers, clients, or stakeholders. **You will submit the URL to this website** within your single-page submission document.

### Your website must include:

- **Executive Dashboard/Homepage**
  - Clear statement of the company and business question being Analysed
  - Key metrics and insights (3-5 major findings)
  - Visual data representations (charts, graphs, maps)
  - Your data-driven recommendations
- **The Story Behind the Data**
  - What business question are you answering for this company?
  - Why does this analysis matter to the company and its stakeholders?
  - What data sources did you use and why?
  - Methodology overview (tools, techniques, analytical approach)
- **Interactive Visualisations**
  - Minimum 5-7 meaningful data visualisations
  - At least one interactive element (filterable charts, hover details, etc.)
  - Visualiations should tell a coherent story
- **Business Insights & Recommendations**
  - What did you discover from the data?
  - What should the company do with this information?

    - What are the limitations and risks?
    - Next steps for implementation
- **Technical Documentation**
    - Data sources and collection methodology
    - Tools and technologies used
    - Brief reflection on using AI (ChatGPT) in your workflow
    - All documentation accessible through your GitHub Pages site

# Part 1: Company & Business Question Selection

**⚠ CRITICAL REQUIREMENT:**

You MUST choose a **real company** (public or private) that has **publicly available data**.

**Restriction**: Any company that was previously analysed by your team or other teams in previous group assignments **CANNOT be used for this assignment**. Your company choice must be fresh and unique.

Select ONE of the following analytical approaches for your chosen company:

### Option A - Market Position & Competitive Analysis

Analyse your chosen company's market position and competitive landscape. Use data to understand market share, competitive threats, pricing strategies, geographic presence, or customer segments. Compare your company's performance against key competitors using publicly available data.

### Option B - Customer Intelligence & Behaviour

Deep dive into understanding your company's customer base using behavioural data, demographics, purchasing patterns, or social media sentiment. Analyse review data, customer feedback, or market research to understand customer preferences, pain points, and opportunities for improvement.

### Option C - Financial Performance & Trends

Analyse your company's financial health and performance trends using publicly available financial data (if public company) or industry benchmarks (if private). Examine revenue streams, profitability, growth patterns, operational efficiency, or stock performance relative to industry peers.

### Option D - Operational Excellence & Efficiency

Use data to Analyse your company's operational performance, supply chain efficiency, resource utilisation, or productivity metrics. Identify bottlenecks, optimisation opportunities, or best practices by comparing operational data against industry standards or competitors.

### Option E - Growth Opportunity Identification

Identify and validate potential growth opportunities for your company using market data, trend analysis, demographic shifts, or emerging technologies. Use data to demonstrate market demand, competitive gaps, or untapped customer segments that your company could pursue.

# Part 2: Data Acquisition & Governance

**You MUST use real datasets**

No synthetic or made-up data. Your analysis must be based on actual, verifiable data sources about your chosen company or its industry.

### Recommended data sources:

- **Kaggle datasets** (business, consumer, market, industry data)
- **Government open data** (data.gov, data.gov.ie, EU Open Data Portal, Companies Registration Office)
- **Financial databases** (Yahoo Finance, Google Finance, SEC EDGAR for US companies, Irish Stock Exchange)
- **APIs** (Twitter/X, Google Trends, Financial APIs, weather data, company APIs)
- **Web scraping** (company websites, product listings, reviews, pricing - with ethical considerations)
- **Public databases** (World Bank, OECD, Eurostat, industry reports)
- **Company reports** (annual reports, sustainability reports, investor presentations)

### Your project must demonstrate:

- **Data Collection & Preparation**
  - Document how you acquired your data
  - Clean and prepare data for analysis (handle missing values, outliers, formatting)
  - Show evidence of data quality checks
- **Data Governance Considerations**
  - Address GDPR compliance (if using EU personal data)
  - Ethical considerations in data collection and usage
  - Proper attribution of data sources
  - Privacy and anonymisation where needed
- **Technical Skills**
  - All data processing must be code-based (Python or R recommended)
  - Use AI tools (ChatGPT, Claude, Copilot) to help write code
  - Document your code with clear comments
  - Create reproducible analysis (others should be able to run your code)

# Part 3: Analytics & Insights Generation

### Apply appropriate analytical techniques:

**Required Analyses (choose at least 3-4):**

- **Descriptive Analytics:** What happened? (trends over time, distributions, summary statistics)
- **Diagnostic Analytics:** Why did it happen? (correlations, segmentation, comparative analysis)
- **Predictive Analytics:** What might happen? (trend forecasting, regression models, simple ML)
- **Prescriptive Analytics:** What should we do? (optimisation, scenario analysis, recommendations)

### Technical Requirements:

- Use Python (pandas, matplotlib, seaborn, plotly) OR R (tidyverse, ggplot2, shiny)
- Generate at least 7-10 visualisations during analysis
- Apply at least one statistical test or machine learning technique
- Document your analytical decisions and interpretations

### Tools you might use (with ChatGPT assistance):

- **Data analysis:** pandas, numpy, scikit-learn
- **Visualisation:** matplotlib, seaborn, plotly, altair
- **Web framework:** HTML/CSS/JavaScript, or tools like Plotly Dash, Streamlit exported to static site
- **Version control:** Git/GitHub

# Part 4: Web Deployment & Presentation

## Your GitHub.io Website

### Technical Requirements:

- Live website accessible at `username.github.io/project-name`
- Mobile-responsive design
- Professional appearance (use templates if needed - Bootstrap, GitHub Pages themes)
- Fast loading time (optimise images and data files)
- All visualisations must render properly online

### Content Requirements:

- **Clear narrative:** Tell a compelling story with your data
- **Visual hierarchy:** Guide viewers through your findings
- **Actionable insights:** What should the company DO with this information?
- **Credibility:** Cite sources, show methodology, acknowledge limitations

### Note on Code and Documentation:

- All project materials should be accessible through your GitHub Pages website
- You may optionally maintain a GitHub repository for version control
- **Remember:** You will submit ONLY your GitHub Pages URL and single HTML file (NOT repository link)

# Working with AI Tools

You are **encouraged and expected** to use AI coding assistants. However:

### ✅ Good AI Usage:

- Ask ChatGPT to explain concepts you don't understand
- Request code examples and adapt them to your needs
- Debug errors with AI assistance

- Generate visualisation code and customise it
- Optimise and refactor your code

### ❌ Problematic AI Usage:

- Submitting AI-generated content without understanding it
- Not adapting AI code to your specific context
- Failing to verify AI suggestions against actual data
- Not documenting that you used AI assistance

**Required:** Include a brief section in your technical documentation (200-300 words) reflecting on:

- How you used AI tools in your workflow
- What you learned about prompting and working with AI
- Challenges you encountered and how you overcame them
- What you had to learn yourself vs. what AI could help with

# Submission Requirements

Submit via Moodle: **TWO FILES**

## File 1: Single-Page PDF/Word Document (1 page maximum)

**Required Elements (all on ONE page):**

- **Student Details:**
  - Your name
  - Student number
  - Programme
  - Module name: Business Intelligence
  - Assignment title: Final Project - Business Analytics-Driven Decision Making
- **GitHub Pages URL:**
  - **ONLY** your live website link: `username.github.io/project-name`
  - **SPELL OUT** the full URL - must be visible as text, not hidden behind hyperlink
  - ✅ **CORRECT:** `GitHub Pages: https://joebloggs.github.io/project`
  - ❌ **INCORRECT:** `GitHub Pages: [Click here](...)`
  - **DO NOT** include GitHub repository link
- **Screenshot:**
  - Single screenshot of the homepage of your GitHub.io site (what users see when first loading the page)
- **Abstract:**
  - Brief summary of your company, business question, and key findings (150-200 words)

**Filename:** `YourName_StudentNumber_BI_Final.pdf`

## File 2: Single HTML File (Self-Contained Project)

**CRITICAL REQUIREMENT:** Your complete BI dashboard must be submitted as a **SINGLE .html file** with:

- All CSS embedded in `<style>` tags (NO external .css files)
- All JavaScript embedded in `<script>` tags (NO external .js files)
- All data embedded directly in JavaScript variables (NO external data files)
- NO external dependencies (images, fonts, libraries must be CDN or embedded)
- **Must work offline** when opened locally in a browser

**Filename:** `YourName_StudentNumber_BI_Project.html`

### How to create:

- Take your main index.html file
- Copy all CSS from external files into `<style>` tags in `<head>`
- Copy all JavaScript from external files into `<script>` tags before `</body>`
- Embed small datasets as JavaScript variables/arrays
- Convert images to base64 or use CDN links
- Test by opening the file locally without internet

**File size limit:** Under 10MB (Moodle restriction)

# Assessment Criteria

| Criterion | Weight | Description |
|---|---|---|
| **Business Relevance & Question Quality** | 15% | Clear business focus on real company, well-defined analytical question, understanding of company context and industry |
| **Data Quality & Governance** | 20% | Appropriate real datasets, proper sourcing, ethical considerations, GDPR awareness, data quality and preparation |
| **Analytical Rigor** | 25% | Correct application of analytical methods, appropriate techniques for the question, valid interpretations, depth of analysis |
| **Insights & Recommendations** | 20% | Actionable findings relevant to company, critical thinking, acknowledgment of limitations, business value of recommendations |
| **Technical Implementation** | 15% | Working website, quality code, effective visualisations, reproducible analysis, proper documentation |
| **Communication & Presentation** | 5% | Clear narrative, professional design, effective data visualisation, engaging presentation of findings |

### Quick Tips:

- Choose a company you're genuinely interested in or have some knowledge about
- Verify early that your chosen company hasn't been used in class presentations
- Use GenAI for code generation and debugging
- Keep visualisations simple but meaningful
- Focus on the website - it contains everything you need. The PDF is just a simple summary document

## Sample Project Ideas

- **"Ryanair's Market Position in European Aviation"** - Analyse Ryanair's competitive positioning using route data, pricing data, and market share information to identify growth opportunities or competitive threats
- **"Customer Sentiment Analysis for Netflix"** - Analyse social media sentiment, review data, and subscriber trends to understand customer satisfaction and content preferences
- **"Amazon's Supply Chain Efficiency"** - Use publicly available data to analyse Amazon's delivery performance, warehouse locations, and operational efficiency compared to competitors
- **"Tesla's Financial Performance and Market Valuation"** - Analyse Tesla's financial metrics, stock performance, and market valuation against traditional automotive manufacturers
- **"Starbucks Location Strategy"** - Analyse Starbucks store locations, demographic data, and competitive positioning to identify optimal expansion opportunities
- **"Irish Times Digital Transformation"** - Analyse the Irish Times' digital subscription trends, content engagement, and competitive position in Irish media market
- **"Airbnb vs Hotel Industry in Dublin"** - Compare pricing, availability, and customer satisfaction between Airbnb and traditional hotels in Dublin to identify market trends

## Technical Resources

### Learning Resources:

- Python for Data Analysis tutorials on YouTube
- Kaggle Learn courses (free)
- GitHub Pages documentation
- ChatGPT for coding help and debugging

### Suggested Tech Stack (choose one):

- **Beginner-Friendly:** Python + Jupyter Notebook + Plotly → Export to HTML → GitHub Pages
- **Intermediate:** Python + Streamlit → Deploy static version to GitHub Pages
- **Advanced:** React + D3.js + GitHub Pages for fully custom interactive dashboard

## Academic Integrity

- This is an individual project - your code and insights must be your own
- Using AI is required and encouraged - but document it
- Collaborating on learning is encouraged - copying code is not

- Properly cite all data sources and any code you adapt from others
- Plagiarism includes submitting purchased projects or having someone else write your code

# Industry relevance

As a business analytics professional, you will constantly need to:

- Validate business assumptions with data
- Understand markets, customers, and competitors
- Make strategic decisions with incomplete information
- Communicate complex insights to stakeholders and executives
- Use technology and AI tools effectively in professional settings

This project builds these essential skills while creating a portfolio piece you can show to potential employers, clients, or business partners.

# Repeat Assessment

- If the submission does not achieve the pass mark (40), the module will have to be repeated by submitting a final report.
- The repeat assessment will follow the same structure as the original assessment.
- Depending on lecturer feedback, students may amend the original project submission or may choose to submit an entirely new project.
- This submission will be worth 100% of the grade and the second final submission will have the same structure as the original one.

# Rubric

| CRITERIA | FAIL 0–39% | SATISFACTORY 40–49% | GOOD 50–59% | COMMENDABLE 60–69% | EXCELLENT 70+ |
|---|---|---|---|---|---|
| **Business Relevance & Question Quality (15%)** | The company and analytical question are unclear, irrelevant, or lack genuine business focus. No evidence of contextual understanding. | The company and business question are minimally relevant; the analytical focus is vague or overly broad. | The company and business question are relevant and mostly well defined, with a clear business focus. | The company and business question are well chosen, strategically relevant, and demonstrate strong understanding of the company and its context. | The company and question are exceptionally relevant, original, and insightfully aligned with a real strategic business challenge, showing deep contextual awareness. |
| **Data Quality & Governance (20%)** | Data sources are missing, unreliable, or fabricated. No evidence of data cleaning or governance. Ethical and GDPR considerations ignored. | Basic data used but lacks validation or depth. Limited cleaning and minimal mention of governance or ethics. | Data sources are appropriate and real. Some evidence of cleaning, preparation, and ethical consideration. | Data are well sourced, verified, and prepared. Clear documentation of governance, GDPR, and ethical handling. | Data are of outstanding quality, comprehensively documented, ethically sourced, GDPR-compliant, and fully transparent in methodology. |
| **Analytical Rigour (25%)** | Analytical methods are incorrect, poorly executed, or inappropriate. No meaningful insight or linkage to theory. | Limited or partially correct analysis. Methods applied superficially with minimal interpretation. | Appropriate analytical techniques applied with generally correct execution and sound interpretation. | Robust analytical approach with clear justification, correct execution, and thoughtful interpretation of results. | Advanced analytical design and flawless execution. Insightful use of multiple analytical lenses (descriptive, diagnostic, predictive, prescriptive) showing deep mastery. |
| **Insights & Recommen-dations (20%)** | Insights are missing, unsupported, or irrelevant. Recommendations are absent or nonsensical. | Basic insights provided but weakly linked to data. Recommendations are vague or generic. | Insights are reasonable and linked to evidence. Recommendations are practical though limited in depth. | Strong, data-driven insights with clear, actionable recommendations supported by analysis. | Transformative insights, actionable strategies, and outstanding critical evaluation of limitations and next steps. Recommendations demonstrate exceptional strategic thinking. |
| **Technical Implemen-tation (15%)** | Website non-functional or incomplete. Visualisations fail to render. Code incorrect or missing. No documentation. | Partially functional website. Some visualisations missing or poorly implemented. Minimal documentation. | Working website with correct embedded code and functional visualisations. Adequate documentation. | Fully functional, visually coherent, and professionally executed BI dashboard. Well-structured and documented code. | Technically excellent site: optimised, elegant, mobile-responsive, and fast. Code is clean, well-commented, reproducible, and showcases mastery of tools. |
| **Communi-cation & Presentation (5%)** | Presentation unclear and disorganised. Visuals confusing or misleading. Poor writing quality. | Some clarity but lacks professional polish. Limited visual coherence. | Clear and generally professional presentation with sound structure and readability. | Very good visual storytelling, coherent narrative, and professional design. | Exceptionally engaging, polished, and professional presentation. Strong narrative flow, persuasive communication, and exemplary data visualisation design. |