

modefinance

a TeamSystem company

# AI & data in Credit Scoring

CREDITO E FINANZA 2024

Mattia Ciprian, CEO modefinance

20 marzo 2024

modefinance

# CHI SIAMO

TeamSystem è il leader italiano nel mercato delle soluzioni digitali per la gestione del business di imprese professionisti.

~2

MILIONI DI  
CLIENTI

695

MILIONI DI EURO  
DI RICAVI NEL  
2022\*

\*dati proforma  
TeamSystem e società  
controllate

3000+

COLLABORATORI  
DIRETTI

40.000

CLIENTI  
COMMERCIALISTI

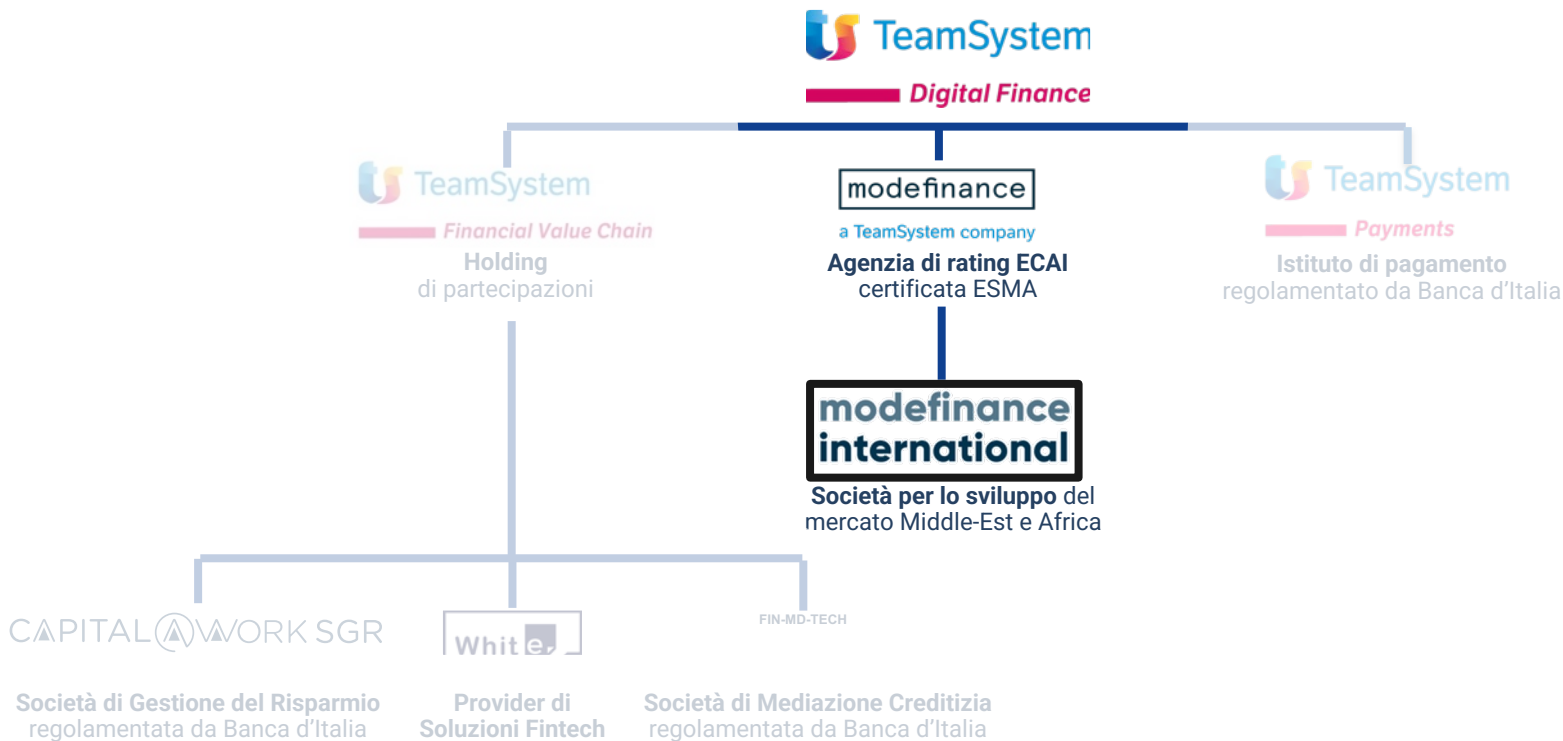
350

SOFTWARE  
PARTNER E  
SEDI DIRETTE



# TeamSystem Fintech

Business Unit che raggruppa competenze complementari in ambito finanziario





## SOLUZIONI DI CREDIT RISK MANAGEMENT

- Piattaforma di analisi rischio credito fruibile in modalità SaaS (Tigran)
- Creazione modelli ad hoc



## RATING

- Emissione di Rating Solicited/Unsolicited con validità ufficiale



## BUSINESS INFORMATION & ALTERNATIVE DATA

- Fornitura di informazioni commerciali di oltre 25M di aziende (S-peek)
- Fornitura di dati alternativi in real time via API

## SERVIZI ESG TRASVERSALI

# AI & data in Credit Scoring

Modefinance's view

**1** Credit scoring: data & algorithms since 1968

**2** Basel 2

**3** Modefinance's view

**4** Current opportunities

**5** Future opportunities

**6** Conclusions

# AI & data in Credit Scoring

Modefinance's view

**1** Credit scoring: data & algorithms since 1968

2 Basel 2

3 Modefinance's view

4 Current opportunities

5 Future opportunities

6 Conclusions

# Z-score and the foundation of credit scoring as a science

Data -> Algorithm -> Test out of sample -> Refine

The true pioneer of credit scoring models: Edward I. Altman, professor of Finance at the Stern School of Business at New York University, developed a model called **Z-Score** published in 1968, which allowed to predict with statistical techniques the probability of business failure in subsequent years.

Altman's work shows the key factors characterizing each and any credit scoring technique:

1. Prepare a **database**;
2. Define and choose **variables**;
3. Choose a **model**;
4. Select a data sample on which to build the model;
5. Apply the model on data not used for its construction;
6. Test and validate the results.



# AI & data in Credit Scoring

Modefinance's view

1 Credit scoring: data & algorithms since 1968

2 **Basel 2**

3 Modefinance's view

4 Current opportunities

5 Future opportunities

6 Conclusions



# Basel 2 pushed the adoption of new scoring models

From the guidelines prepared by the Oesterreichische Nationalbank (OeNB)



## HEURISTIC MODELS

- classic Rating questionnaires
- qualitative systems
- expert systems
- Fuzzy Logic



## MACHINE LEARNING

- discriminating analysis
- regression models
- Neural Networks
- Support Vector Machine



## CAUSAL MODELS

- option pricing models
- cash flow simulation models



## HYBRID FORMS

- from the integration of a heuristic model and one or more statistical models

# AI & data in Credit Scoring

Modefinance's view

1 Credit scoring: data & algorithms since 1968

2 Basel 2

3 **Modefinance's view**

4 Current opportunities

5 Future opportunities

6 Conclusions

# AI & Data to assess the companies on a global scale

Italian companies are the easiest to evaluate

- different accounting standards;
- different economical behavior for the different countries;
- different economical behavior for the different sectors;
- missing of financial data for the bankrupted companies;
- “holes” in the financial data (BS, P&L);
- companies without financials.

## GLOBAL DATABASE

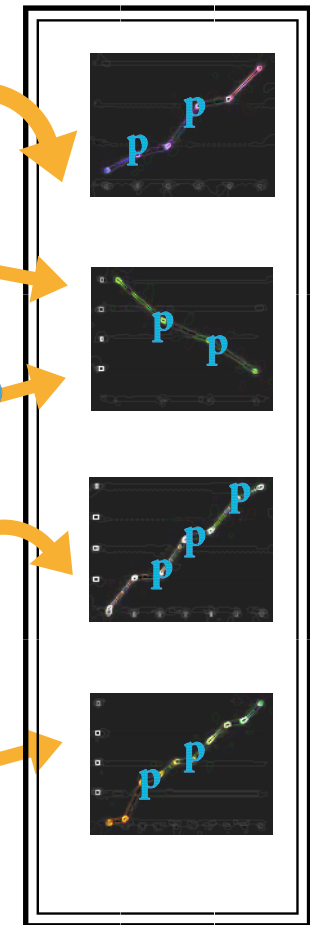
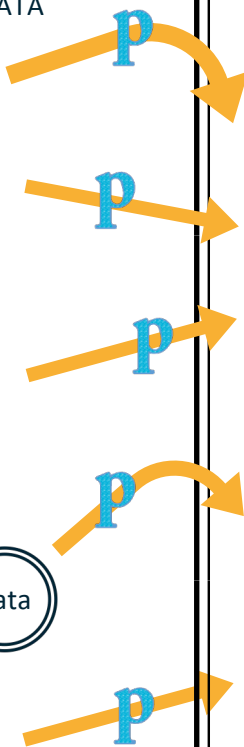


■ Italy ■ Rest of World ■ Without data

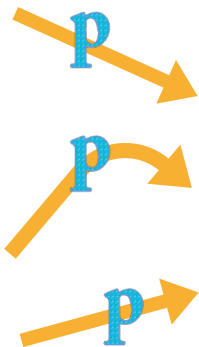
STRUCTURED DATA



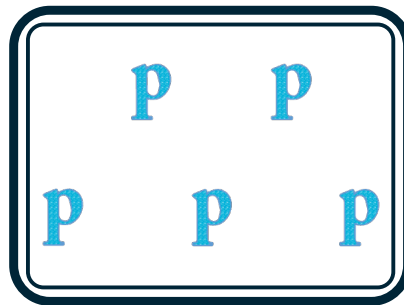
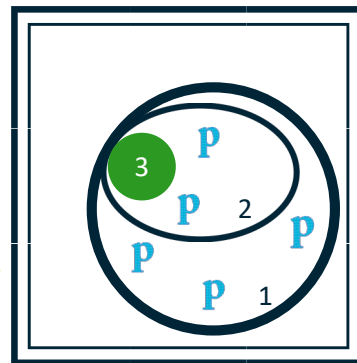
UNSTRUCTURED DATA



FUZZY TRANSFORMATION



GAME THEORY MODEL



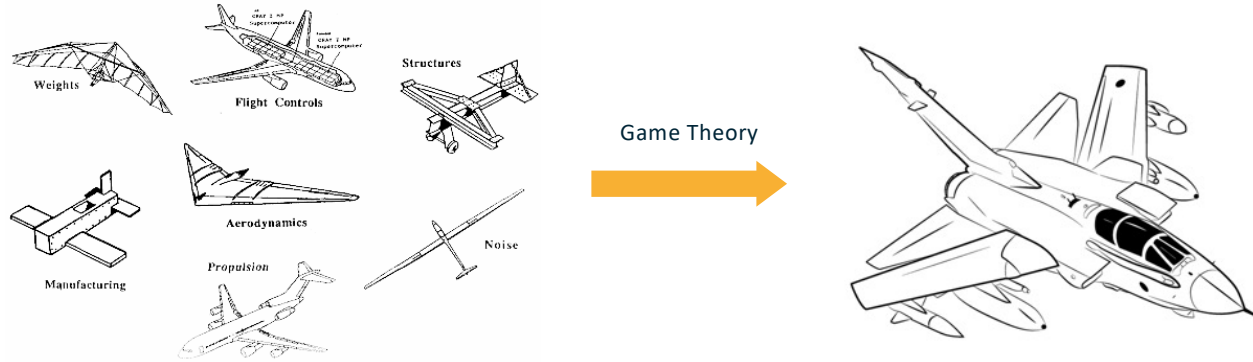
PARAMETERS



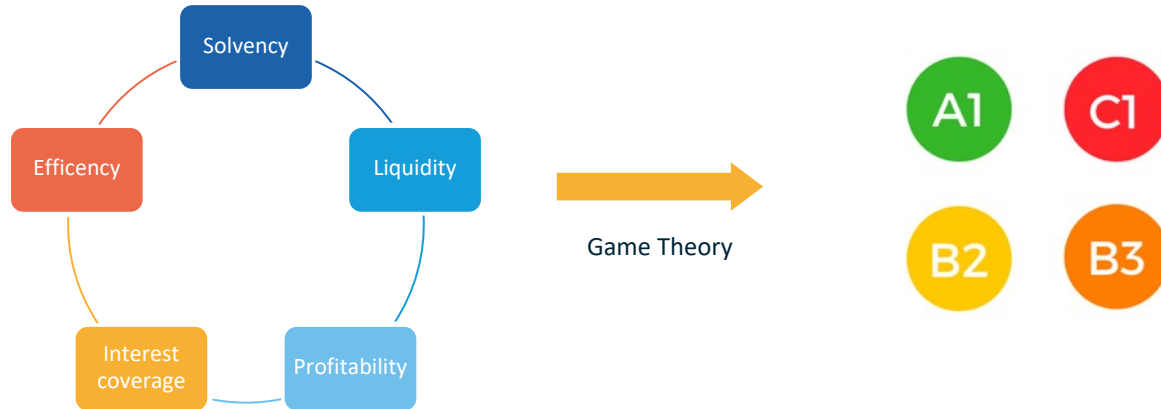
ARTIFICIAL  
INTELLIGENCE



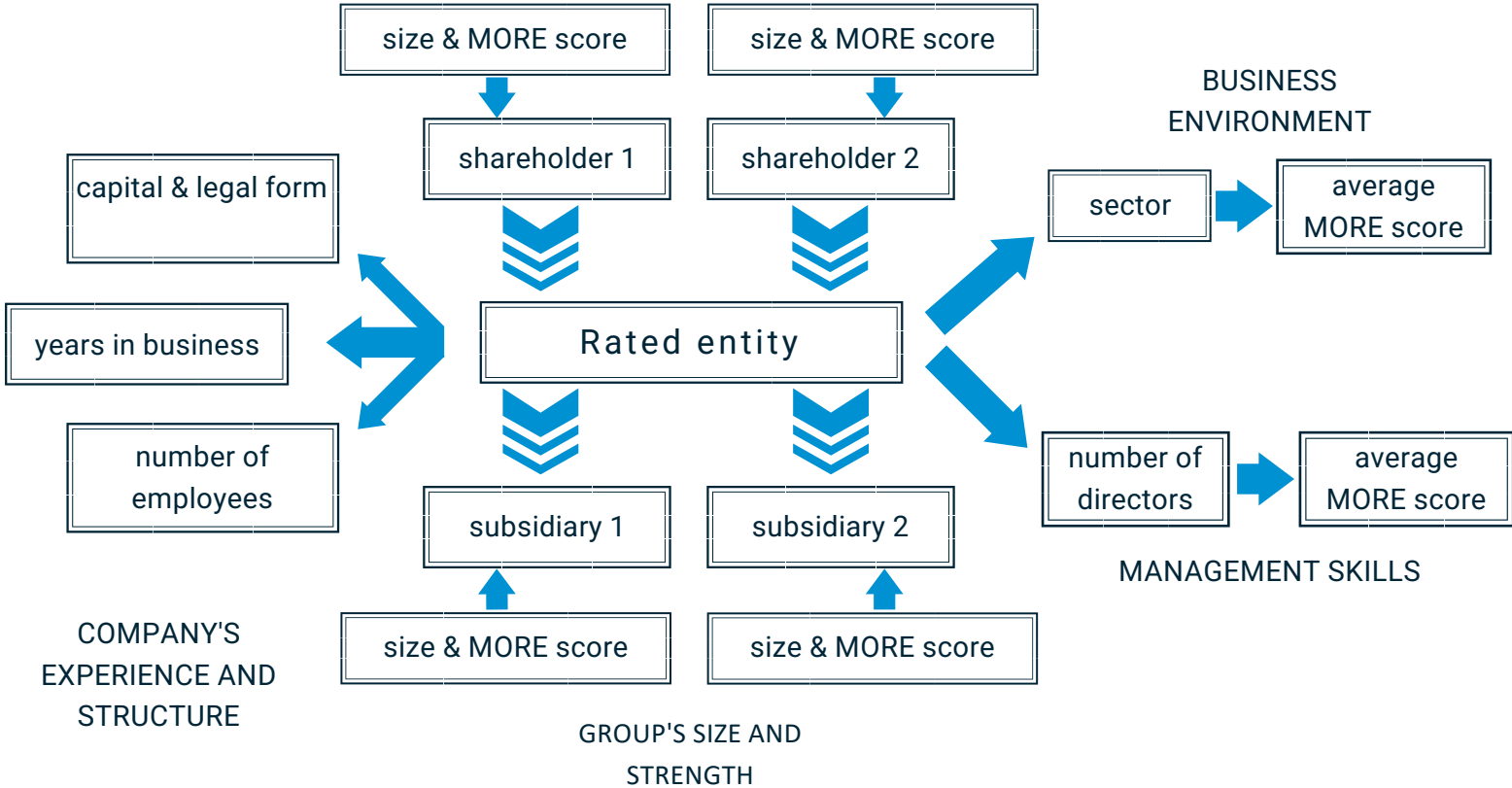
# Game Theory



Applying Game Theory allows balancing the different needs and aspects to obtain the best-fitting solution in any sector or scope.



# Companies without data: AI selection



# AI & data in Credit Scoring

Modefinance's view

1 Credit scoring: data & algorithms since 1968

2 Basel 2

3 Modefinance's view

4 **Current opportunities**

5 Future opportunities

6 Conclusions

# Last decade of data opportunities

The data availability history

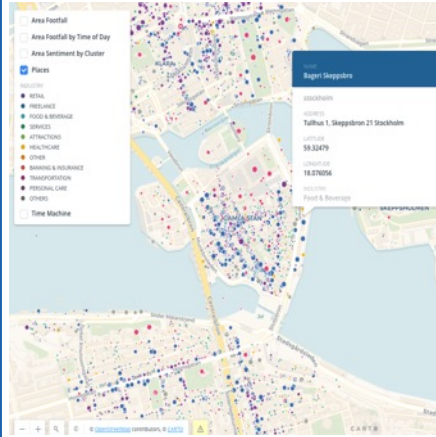
## 2015

- IoT systems



## 2018

- Socials (after Cambridge Analytica )



## 2019

- PSD2



## 2024

- Alternative data





# Electronic invoices + AI

Nowcasting to convert uncertainty into sureness

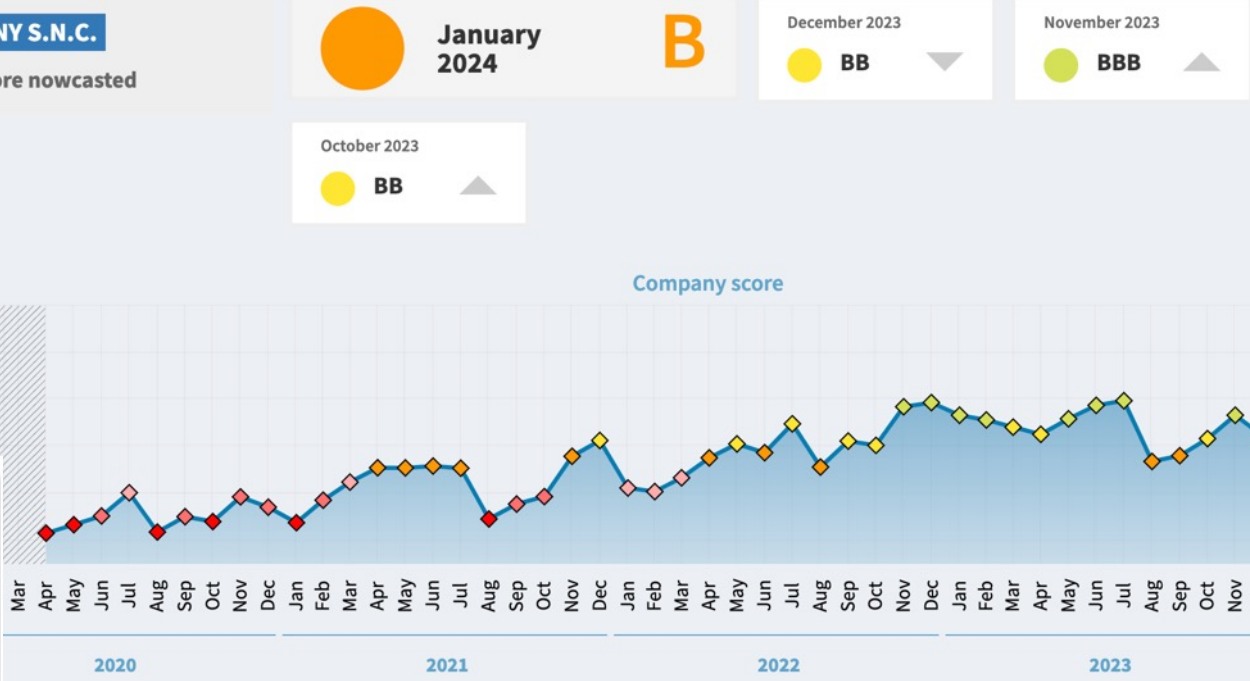
**Rating finale**

**COMPANY S.N.C.**

**MORE Score nowcasted**

Fatture elettroniche di acquisto (codice da com... rtori: MSUNCR1)

DATA	AMMONTARE	STATO
2023/03/01	100000	OK
2023/03/02	100000	OK
2023/03/03	100000	OK
2023/03/04	100000	OK
2023/03/05	100000	OK
2023/03/06	100000	OK
2023/03/07	100000	OK
2023/03/08	100000	OK
2023/03/09	100000	OK
2023/03/10	100000	OK
2023/03/11	100000	OK
2023/03/12	100000	OK
2023/03/13	100000	OK
2023/03/14	100000	OK
2023/03/15	100000	OK
2023/03/16	100000	OK
2023/03/17	100000	OK
2023/03/18	100000	OK
2023/03/19	100000	OK
2023/03/20	100000	OK
2023/03/21	100000	OK
2023/03/22	100000	OK
2023/03/23	100000	OK
2023/03/24	100000	OK
2023/03/25	100000	OK
2023/03/26	100000	OK
2023/03/27	100000	OK
2023/03/28	100000	OK
2023/03/29	100000	OK
2023/03/30	100000	OK
2023/03/31	100000	OK



**January 2024** **B**

**December 2023** **BB**

**November 2023** **BBB**

**October 2023** **BB**

# Electronic invoices + AI

Nowcasting to convert uncertainty into sureness

COMPANY S.N.C.

Reference year 2024

Turnover change forecast

Projected change in turnover **2.0%** at the end of the year

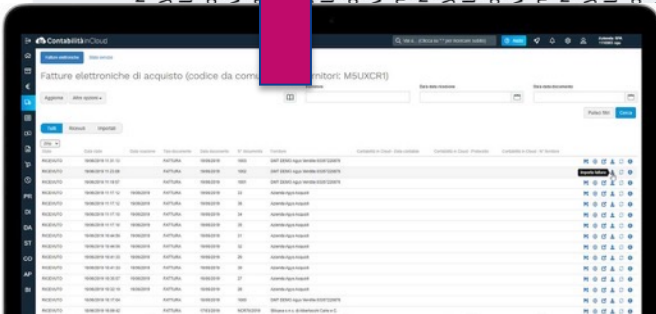


## Income statement (€)

	2022-12-31 UNCONSOLIDATED	2023-12-31	2024-12-31	2025-12-31
<b>+ Sales</b>	63,530,518	69,883,570	71,221,238	71,555,695
<b>Operating revenue / turnover</b>	69,028,474	75,381,526	76,719,194	77,053,651
	66,476,163	74,377,652	75,593,503	74,931,053
	2,552,311	1,003,874	1,125,691	2,122,598
Depreciation	1,449,889	1,542,032	1,711,994	1,827,098
<b>EBIT</b>	1,102,422	(538,158)	(586,303)	295,500
<b>+ Financial P/L</b>	444,640	450,769	463,043	489,418
<b>P/L before tax</b>	1,547,062	(87,389)	(123,260)	784,918
<b>+ Extr. and other P/L</b>	-	-	-	-
<b>P/L before tax + Extr. and other P/L</b>	1,547,062	(87,389)	(123,260)	784,918
Taxation	343,334	0	0	282,570
<b>P/L for period</b>	1,203,728	(87,389)	(123,260)	502,347

Applications:

- UTP clustering and debt restructuring
- Business planning
- Treasury management
- Monitoring
- Early alerts
- ...



# AI & data in Credit Scoring

Modefinance's view

1 Credit scoring: data & algorithms since 1968

2 Basel 2

3 Modefinance's view

4 Current opportunities

5 **Future opportunities**

6 Conclusions

# Too fast! Let's have a look at 2024

## GenAI for documents, not for data

- **Benefits:** GenAIs can automate the summarization process, saving time and effort for users. They can also generate summaries for large volumes of documents at scale.
- **Challenges:** Ensuring the accuracy and coherence of generated summaries remains a challenge, requiring ongoing research and development.
- **Application:** ESG & annual reports

While Generative Adversarial Networks (GANs) have shown efficiency in reading and summarizing documents, **data mining** for document analysis still has its weaknesses:

1. Limited Context Understanding
2. Noise and Irrelevance
3. Domain Specificity
4. Lack of Explainability
5. Data Quality and Bias

# Too fast! Let's have a look at 2024

GenAI & ESG



- S1 **DYNAMIC** company
- S2
- S3
- S4 **RESPONSIBLE** company
- S5
- S6
- S7 **VULNERABLE** company



<p>PAULORCOSE VA LEUCONA, 27 00100 ROMA</p>	
<p><b>6</b> Identifying and Calculating GHG Emissions</p>	

<p>Numero cliente: <b>630377777</b></p> <p>POD: <b>IT02ES304996T</b></p> <p>Officina: <b>Acea Unica</b></p> <p>Attivazione offerta: <b>27 gennaio 2011</b></p> <p>Codice cliente: <b>002805181267</b></p>		<p><b>Bolletta per la fornitura di ENERGIA ELETTRICA</b></p> <p>Numero bolletta: 101 20106572P</p> <p>Struttura: 201020013</p> <p>Ultimo giorno di riferimento: 07 settembre 2013</p> <p>Periodo di riferimento: 1 settembre 2013 - 30 settembre 2013</p> <p>Periodo di conteggio: 1 settembre 2013 - 30 settembre 2013</p> <p><b>Totale da pagare: 178,95 euro</b></p> <p>Scadenza: <b>21/01/2014</b></p> <p>La sua bolletta può essere addebitata automaticamente.</p> <p>Per maggiori informazioni e per sottoscrivere il servizio di addebito automatico, visitate il sito <a href="http://www.aceaunica.it">www.aceaunica.it</a></p>
<p><b>Dati fornitura</b></p> <p>Intestatario contratto: Paolo Rocco</p> <p>Codice fiscale contratto: 01000001013</p> <p>Indirizzo fornitura: Via Leucina, 27 - 00100 Roma</p>		<p><b>Riepilogo corrispettivi</b></p> <p>Totale servizio di vendita: 80,30 euro</p> <p>Totale servizio di rete: 45,00 euro</p> <p>Totale servizio di distribuzione: 14,00 euro</p> <p>Totale di altri servizi (servizi di attivazione, servizi di manutenzione, servizi di assistenza clienti): 13,00 euro</p> <p>Totale IVA (compensazione di imposte): 16,27 euro</p> <p><b>Totale bolletta: 178,95 euro</b></p>

# AI & data in Credit Scoring

Modefinance's view

1 Credit scoring: data & algorithms since 1968

2 Basel 2

3 Modefinance's view

4 Current opportunities

5 Future opportunities

6 **Conclusions**

# Conclusions?

## Some suggestions

1

AI (starting from machine learning models) have been always employed in credit scoring: **GenAI** is the news, but it works properly “only” in document analysis

2

In comparison to the past, there is an abundance of data. The challenges are: a) Using them in compliance with **privacy** laws and **GDPR** b) Utilizing data that are mostly aligned with **financial data**  
In this regard, **electronic invoicing** data has proven to be the most promising

3

In the future, a winning strategy will combine, perhaps with AI, various data sources from **different contexts** and with different **update frequencies**. The result will be **real-time updates** and a good **predictive** capacity for the future even in conditions of **uncertainty**.



**GRAZIE PER L'ATTENZIONE  
MATTIA CIPRIAN  
CEO – MODEFINANCE**

**[mattia.ciprian@modefinance.com](mailto:mattia.ciprian@modefinance.com)**

**[m.ciprian@teamsystem.com](mailto:m.ciprian@teamsystem.com)**