

# Artificial Intelligence-assisted Tool To Ensure Trust And Explainability In Business Risk Management

Presented by

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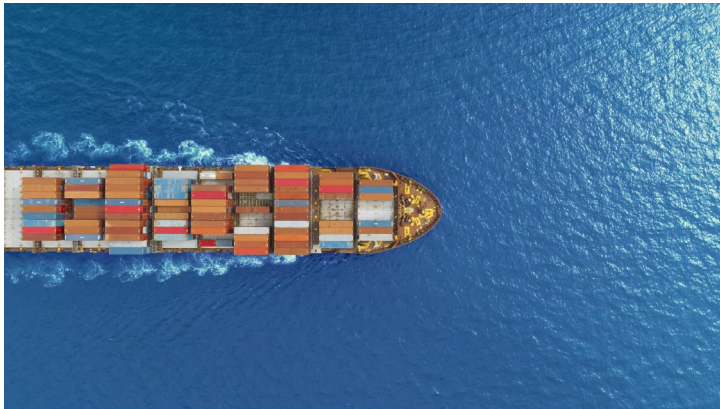
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ML model's prediction >>>> **High risk of delays**



Risk Manager's Resolution >>>> **Increase the workforce and extend work hours.**



Supplier goes bankrupt, and a storm hits

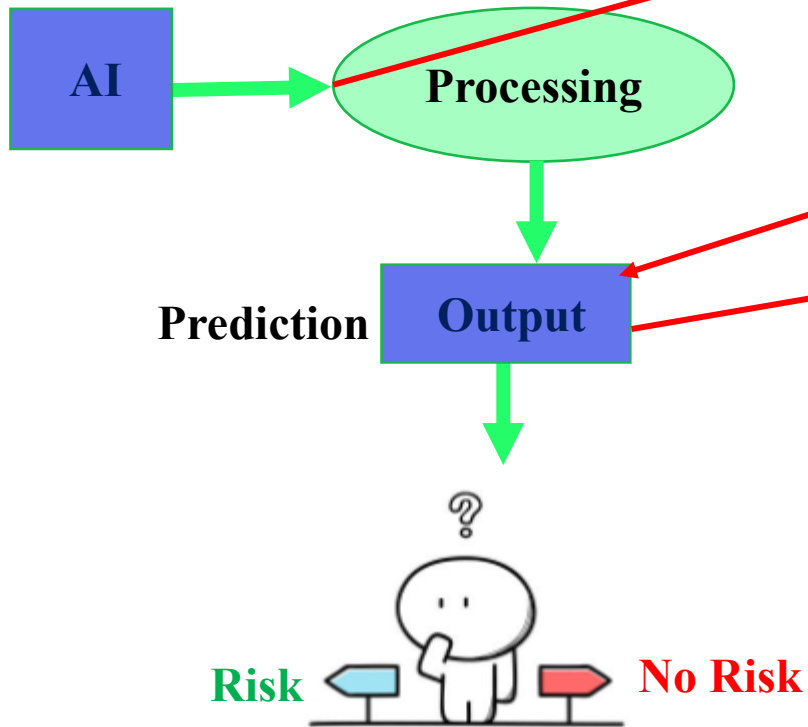
The project faces significant delays and cost overruns

**The fact** >> A series of cascading events: a supplier's financial instability, which led to late deliveries of materials and a concurrent risk of severe weather conditions.



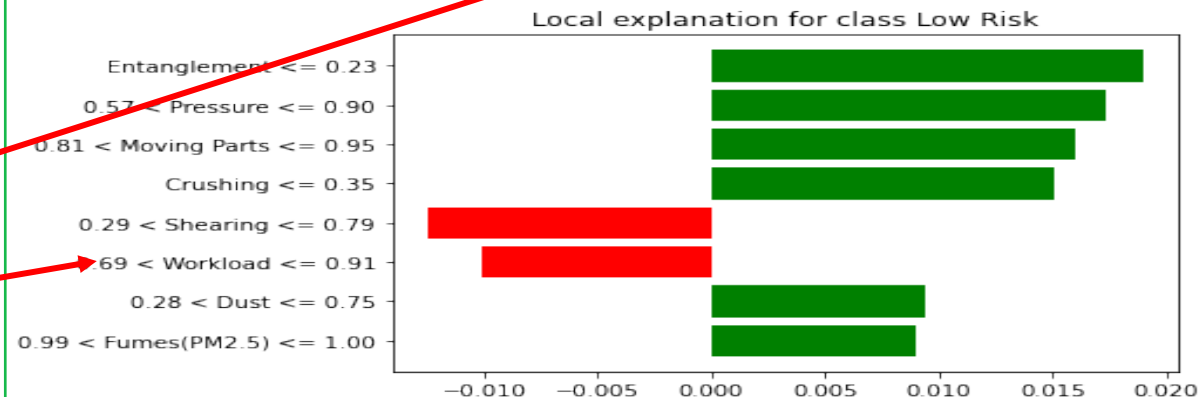
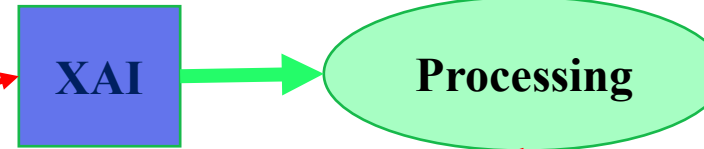
# Artificial Intelligence Vs Explainable Artificial Intelligence (XAI)

## Black box



How prediction models work?

## Glass box

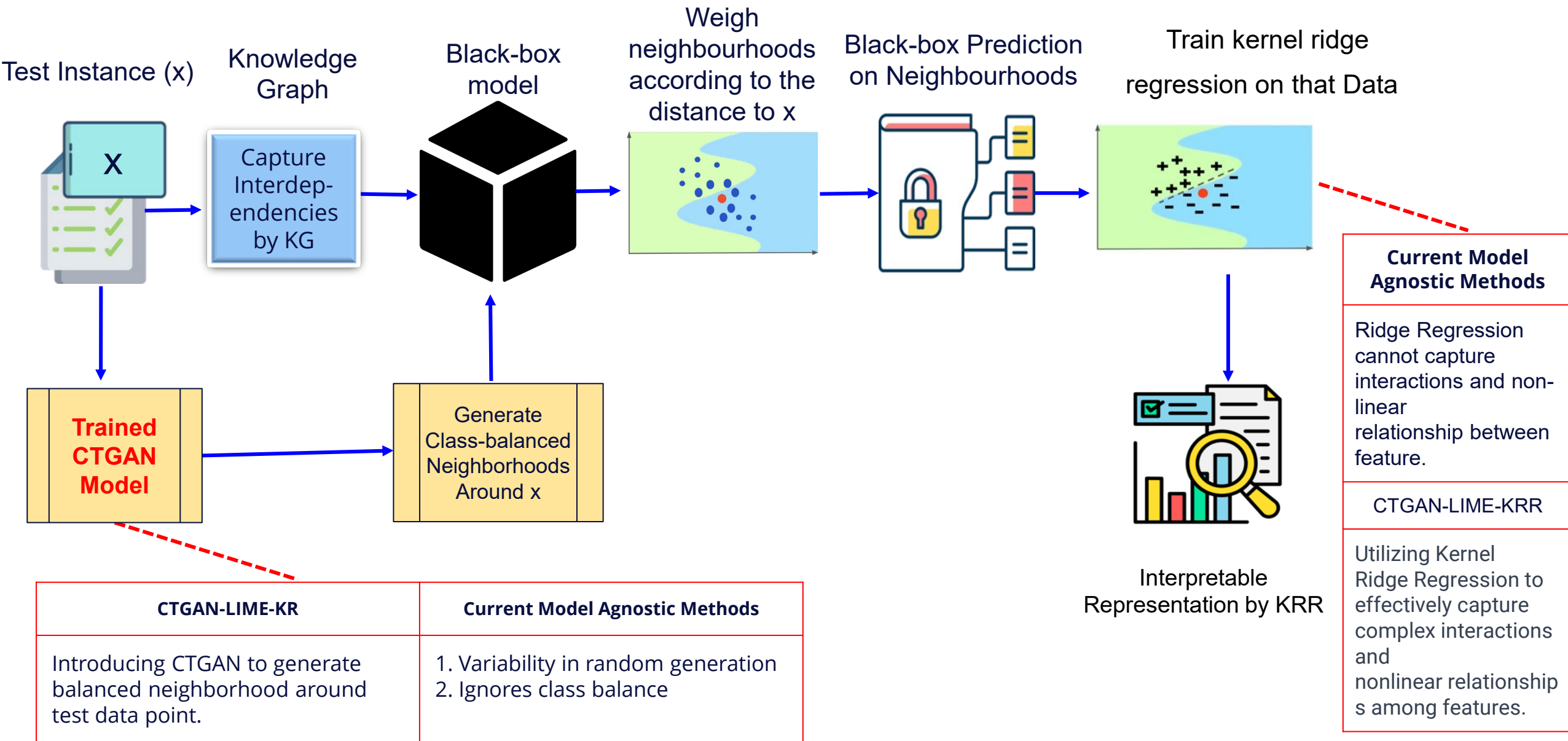


XAI outcome

Interpretable outcomes



# Proposed Model: CTGAN-LIME-KR



**Current Model Agnostic Methods**

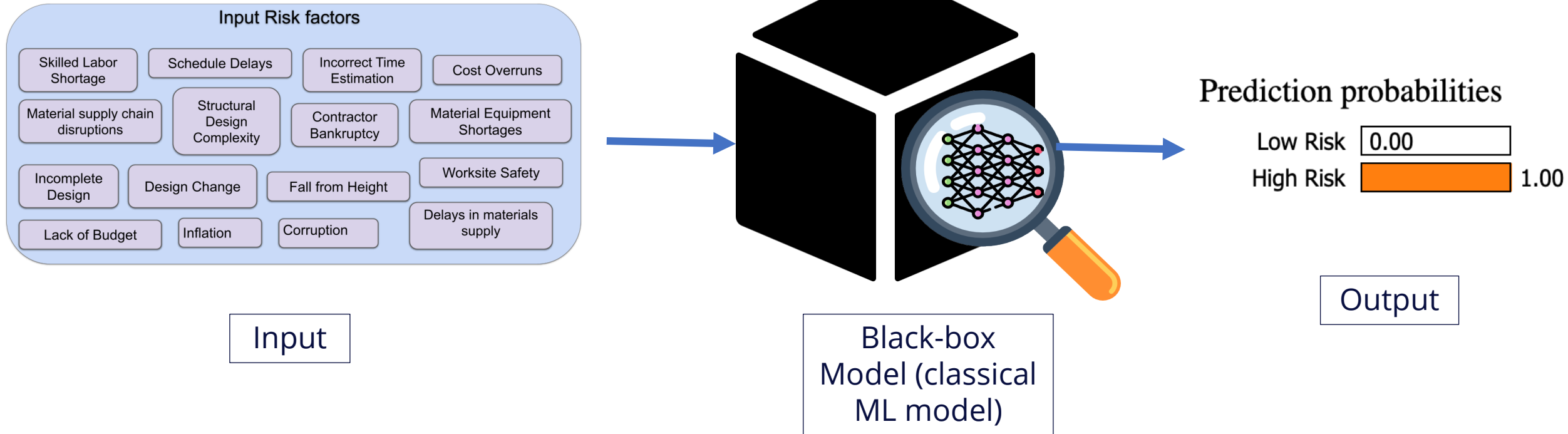
Ridge Regression cannot capture interactions and non-linear relationship between feature.

**CTGAN-LIME-KRR**

Utilizing Kernel Ridge Regression to effectively capture complex interactions and nonlinear relationships among features.

# A Case Study on Construction Project Risk Management

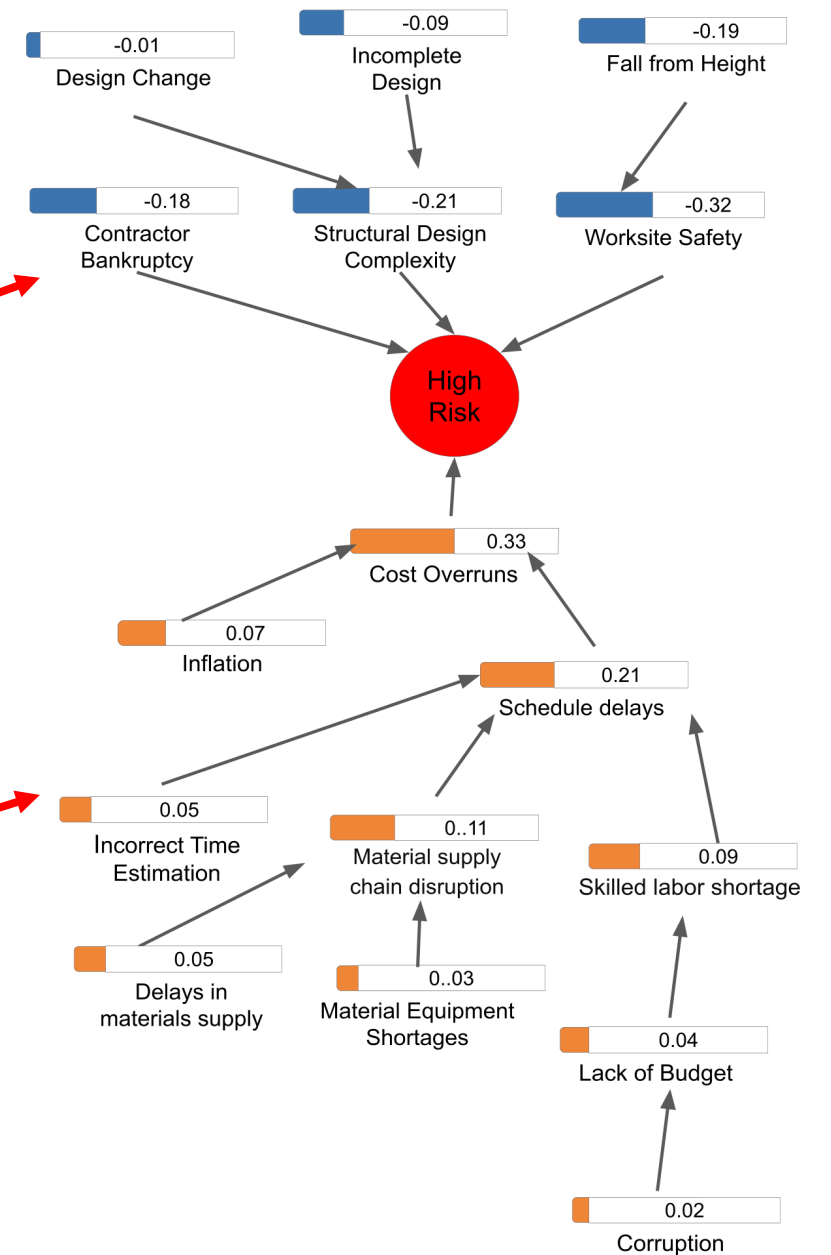
Prediction Result (sample) from a classical ML model



# Our Model (CTGAN-LIME-KR)'s Results

Features with less influence on high-risk prediction

Features exert a notable impact on high-risk scenarios



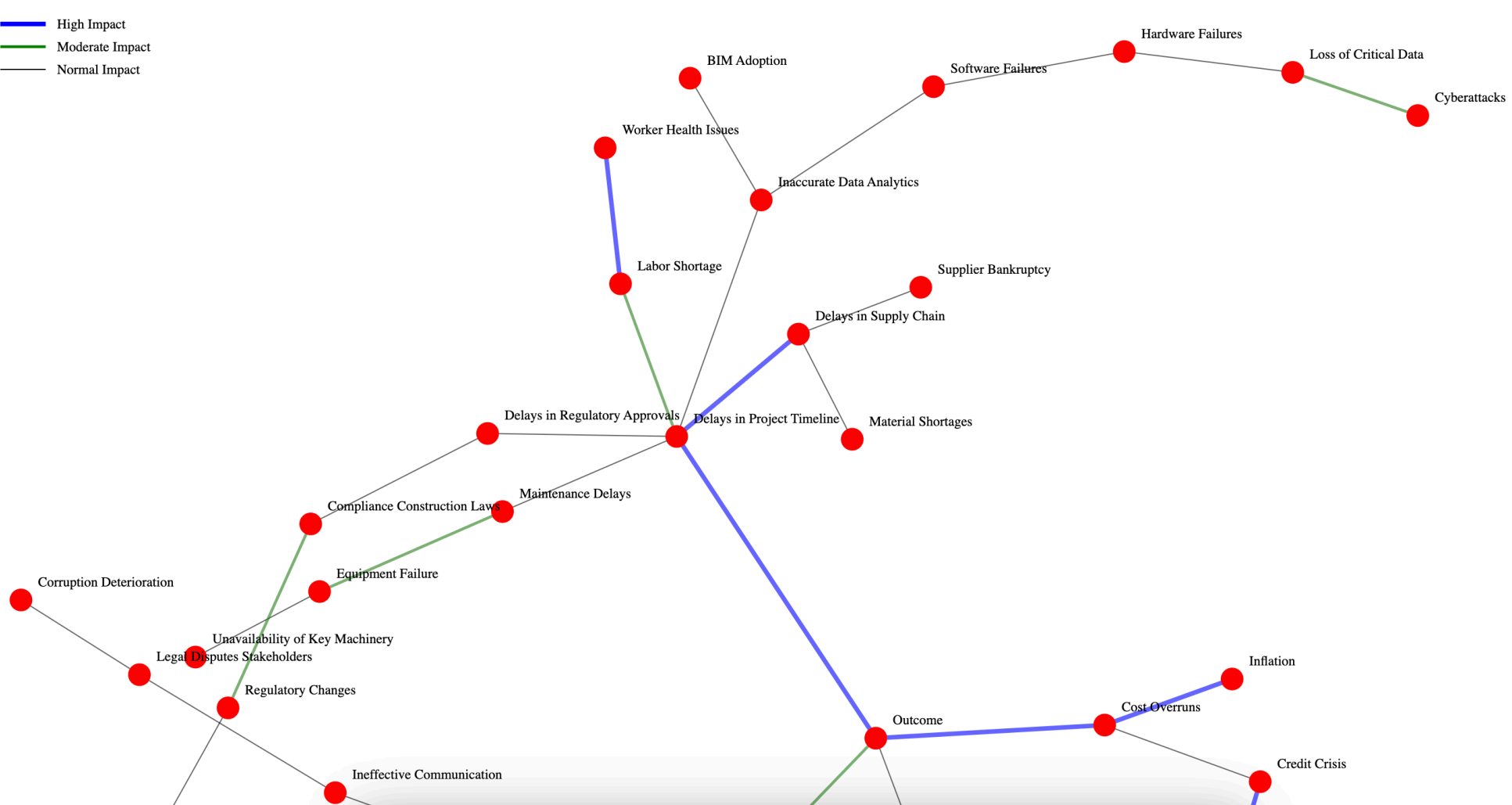
# A Detailed Journey for Handling Risks (Counterfactual Explanation)

## Generated Counterfactuals

#	Inflation	Interest Rates	Credit Crisis	Cost Overruns	Material Shortages	Delays in Supply Chain	Supplier Bankruptcy	Delays in Project Timeline	Quality Control Failures	Equipment Failure	Maintenance Delays	Unavailability of Key Machinery	BIM Adoption	Cyberattacks
1	4.4047724	4.077299332856416	1	10.241052175	Medium	20	0	2	High	Low	3	Medium	Medium	0
2	6.789267873576293	4.077299332856416	0	14.04396212	Low	20	0	9	High	Low	3	Medium	Medium	0
3	4.4047724	4.077299332856416	1	10.241052175	Medium	20	0	2	High	Low	3	Medium	Medium	0
4	2.3686167	4.077299332856416	0	21.467546243	Low	20	0	11	Medium	Low	3	Medium	Medium	0
5	2.8510589	4.077299332856416	1	0.791054444	Low	20	0	2	High	Low	8	Medium	Medium	0
6	6.789267873576293	4.077299332856416	0	14.04396212	Low	20	0	9	High	Low	3	Medium	Medium	0
7	6.789267873576293	4.077299332856416	0	14.04396212	Low	20	0	9	High	Low	3	Medium	Medium	0
8	2.8510589	4.077299332856416	1	0.791054444	Low	20	0	2	High	Low	8	Medium	Medium	0
9	4.4929925	4.077299332856416	0	5.82478188	Medium	20	1	2	High	Low	3	Medium	Medium	0
10	6.789267873576293	4.077299332856416	1	14.400914277	Low	20	0	11	Low	Low	3	Medium	Medium	0
11	6.789267873576293	4.077299332856416	1	14.400914277	Low	20	0	2	Low	Low	3	Medium	Medium	0
12	2.8510589	4.077299332856416	1	0.791054444	Low	20	0	2	High	Low	8	Medium	Medium	0
13	6.789267873576293	4.077299332856416	0	14.04396212	Low	20	0	9	High	Low	3	Medium	Medium	0
14	6.789267873576293	4.077299332856416	1	21.293734683	Low	20	0	2	High	Low	3	Medium	Medium	0

# A Detailed Journey for Handling Risks (Counterfactual Explanation)

- High Impact
- Moderate Impact
- Normal Impact





# Other Areas...

