$$L_1 = \sum_t 1_t \, d_t \sum_j a_{tj} \left(\frac{P_{j,0}}{S_j} \right)$$

$$\sigma = Y(t)\sigma(t_0) + \int_{t_0}^{t} Y(t)Y^1(\tau)v(\tau)d\tau$$

$$\sigma'^{(1)} = \sum_{k=1}^{K} \sum_{n=1}^{m} C_{k,n}^{(i)} e^{-\sum(n_n^* \chi_n)}$$

SOLUTION BRIEF / RISK MANAGEMENT

More future security:
Make the right decisions for tomorrow, today,
with mathematics-based risk management.

More efficient business processes, higher quality, greater customer satisfaction, and all that with lower costs? Rely on scientifically sound risk management technologies to be able to make future-proof decisions with reliable data.

Make the right decisions. Costs, quality and volume – every optimisation moves within this tension triangle: For example, if you cut costs, this has a corresponding impact on the quality and volume parameters. But how can a well-founded decision be made as to what the right degree of improvement is for the given situation – today and in future?

Costs

Quality   Volume
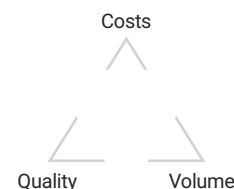
Create well-founded projections with algorithms. The basis for sustainable strategic decisions is provided by a digital company twin with precise algorithmic intelligence. In contrast to AI-based twins, this "Mathematics Twin" doesn't work with data from the past. Rather, new data is produced which shows the exact impact of a change. The consequences of strategic decisions such as the restructuring of business processes or the impacts of external and/or unexpected risks, for example an environmental disaster, can therefore be managed better.

Risk management with "Mathematics Twin":
We can calculate "the butterfly effect" for you

Innovative risk management for all industries

The heart of the solution is the URM group's patented X-ACT algorithm which was developed in the 1970s as part of a NASA project and has been perfected in hundreds of practical applications. X-ACT looks at business problems through the eyes of science – and very successfully, as the following examples of possible applications show:

Healthcare – optimisation of hospitals. For example, hospitals use X-ACT to reconcile their competing goals in the "tension triangle" of costs, quality of treatment and care, and patient capacity. The platform provides sustainable answers – e.g. regarding resource management and patient flow.

9 % immediate cost reduction for patient care
10 % future savings with improved quality of care*
* Hospital optimisation in the Hôpitaux de Paris

Insurance – protect against risks and test new offers. Beyond protecting against risks on the basis of a fact-based evaluation, insurance companies use X-ACT, for example, to test processes, products and services in a virtual environment and thus make the right strategic decisions.

Banks – successful IT migration. The IT harmonisation in bank mergers costs millions – and often has suboptimal results. With X-ACT, various scenarios - such as the best possible migration of payment systems – can be simulated – without a system having to stop for even a second.

Transport and Logistics – "tear-resistant" supply chains. The digital twin generated with X-ACT shows transport and logistic companies all components and dependencies of the supply chain – and therefore potential sources of errors and causes of bottle necks. This makes the platform ideal for developing secure and green supply chains.

The French postal service provider La Poste saves over 100 million euros with X-ACT
Supply chain optimisation with X-ACT – as a result, La Poste could reduce its sorting centres by 30 percent. Thanks to savings made in terms of the transport routes and vehicles, CO_2 emissions were reduced by almost 20 percent.

»As consumer demands for postal services evolve and competition intensifies, X-ACT has helped our organization make strategic decisions that net cost savings without impacting the quality of services we are committed to preserving.«
Alain Roset, President of Mail, La Poste

Utilities – climate protection and security of supply. Achieve prescribed climate protection targets – without passing all of the costs onto the customers in the process? – Accomplish the energy revolution with regard to network stability, network dimensioning and storage capacities? With X-ACT, electricity, water and gas suppliers find well-founded answers to all of these questions.

Manufacturing – greater efficiency with production digitalisation. On the way to the smart factory, X-ACT can also help to find the right answers to the questions of the digital transformation of processes. The result: noticeably more efficiency, which even in times of recession, maintains, if not increases competitive strength.

»**The URM Group's X-ACT Technology has got what it takes to 'save the world' – if this is understood to mean the answers to the current most pressing climate, supply and geopolitical issues: Reducing CO_2 emissions, ensuring energy supply and resilient supply chains. These topics that affect us all are linked to complex strategic questions that the 'Mathematics Twin' can calculate a well-founded answer to.**«
Andreas Böning, Senior Director Strategic Advisory at NTT DATA

Completely novel risk management – faster, more precise, more effective

- **Calculation of situations that have never occurred before.** Without data from the past (such as data-driven models), the reality is mathematically depicted. This means that it is possible to create completely new what-if scenarios.

- **Implementation in 3 months instead of 3 years.** Thanks to the database, which has grown to over 20,000 libraries in the past decades, our digital twin does not have to be newly created, but only adjusted to the respective corporate reality. Thus, the complete twin, as experience has shown, is usually available in just 3 months.

- **Little input required.** Unlike in large strategy consulting projects, the expenditure on the customer side for the creation of the model is minimal. The reason: Most scientific data is publicly accessible. Whatever additional data is required, is usually already digital and can easily be imported.

- **Significantly lower IT costs.** Algorithmic intelligence requires significantly lower IT costs than computationally-intensive artificial intelligence (AI). The immense costs for the lengthy development of data lakes can now be spared. Put simply: Our company twin runs on all conventional laptops.

»Our digital twin is not based on data, but rather it mathematically describes dependencies and interactions. This doesn't mean that we don't need any information. We must, however, be aware of the parameters of the infrastructure and processes, for example: How many and which transportation vehicles are there? We don't need any historical data like a tachograph for our calculations.« «

Athanasios Andreou, Managing Consultant at NTT DATA

This is how the "Mathematics Twin" works

- **1. Create a mathematical model.** With mathematical descriptions and the exact circumstances of your company, a company twin is created.

- **2. Calculate a model using an algorithm.** With sensitivity analysis methods and the what-if scenarios, the algorithm can perform the exact calculations to solve your problem.

$$L_1 = \sum_t 1_t\, d_t \sum_j a_{tj} \left(\frac{P_{j,0}}{S_j}\right)$$

$$\sigma = Y(t)\sigma(t_0) + \int_{t_0}^{t} Y(t)Y^1(\tau)v(\tau)d\tau$$

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4 steps to successful risk management

With over 50 years' IT and process experience across all industries, NTT DATA ensures that X-ACT also provides valuable results for effective risk management in their company within a very short time. You too can count on our expertise on your way to successful risk management. Here is an overview of our approach:

1. Consultation
- Precisely describe the problem and goals

2. Company twin implementation
- Systematically gather data
- Model the twin
- Check the integrity and functionality

3. Solution
- **Repair:** Identify weak points with sensitivity analysis
- **Optimize:** Implement improvements in the existing system
- **Transform:** Find sustainable solutions with what-if scenarios

4. Training
- Train users in working with X-ACT

»The key factor for the successful use of our company twin is the exact problem and goal definition. Many of our customers quickly reach a dead end. For example, reliability. However, instead of asking how I can make my IT even more fail-safe, it is more productive to check what actually needs to be more robustly designed. We therefore always start with a Problem Statement Workshop.«

**Paschalis Andreou,
Strategic Business Creator
at NTT DATA**

Über NTT DATA

NTT DATA – a part of NTT Group – is a trusted global innovator of IT and business services headquartered in Tokyo. We help clients transform through consulting, industry solutions, business process services, IT modernization and managed services. NTT DATA enables clients, as well as society, to move confidently into the digital future. We are committed to our clients' long-term success and combine global reach with local client attention to serve them in over 50 countries.

Visit us at **de.nttdata.com**

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Trusted Global Innovator