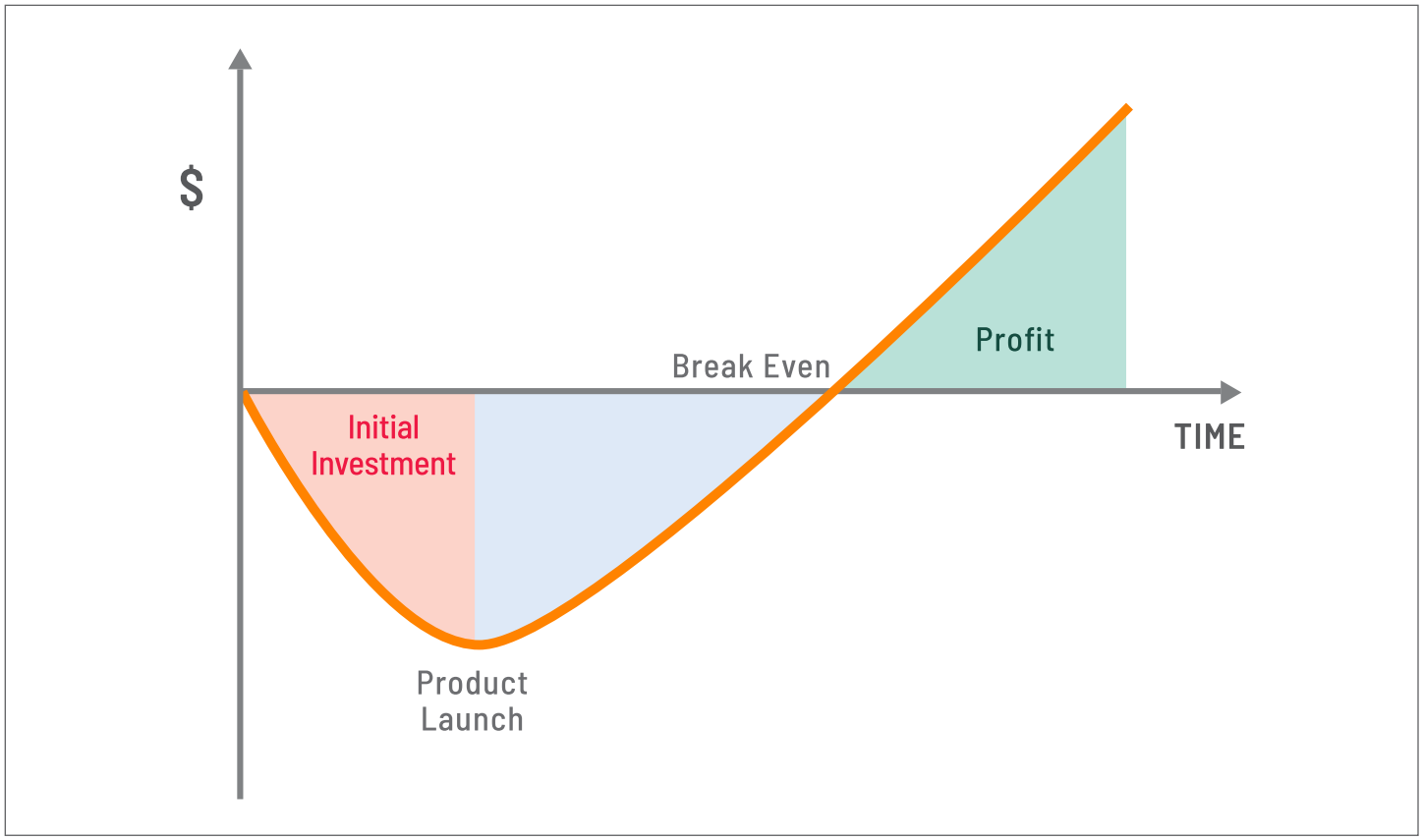
CITRINE INFORMATICS
citrine.io • info@citrine.io

HOW AN AI-ENABLED DATA INFRASTRUCTURE IMPACTS THE BOTTOM LINE



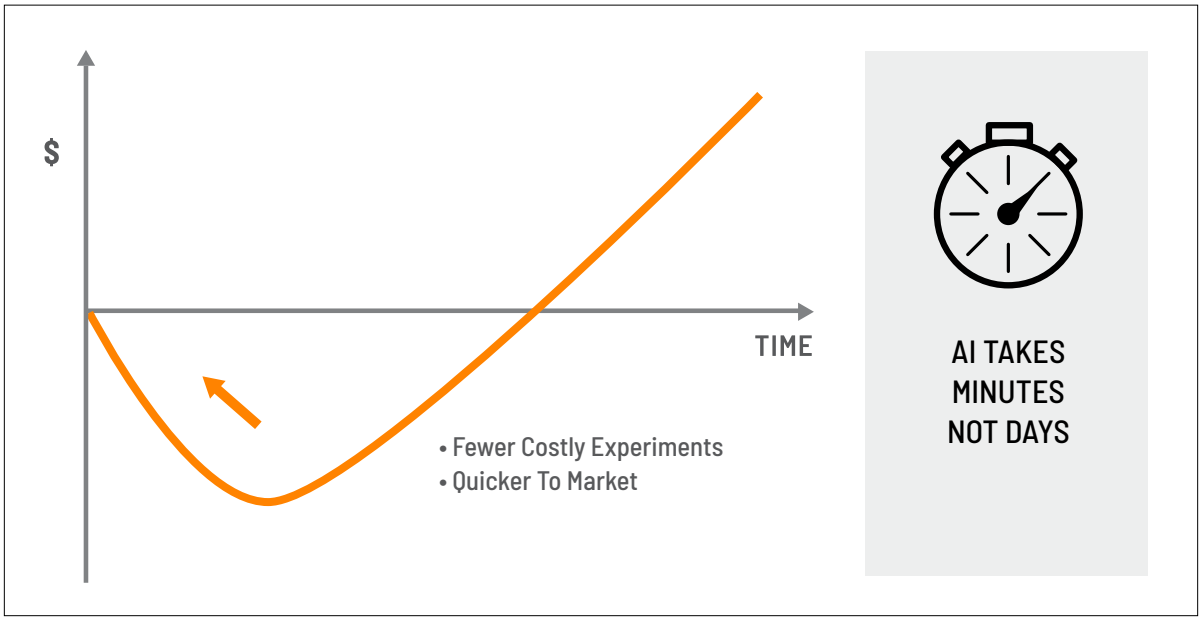
This kind of chart is familiar to all materials and chemical companies who invest in new product development. It can take significant amounts of time for sunk costs to result in profit.

This paper will outline how an AI-enabled data infrastructure can:

- reduce initial investment cost
- reduce time to break even
- decrease production costs
- increase product value and market share

We will demonstrate how materials informatics can systematically improve return on investment (ROI) for new product development, with a platform that becomes more powerful with each new project.

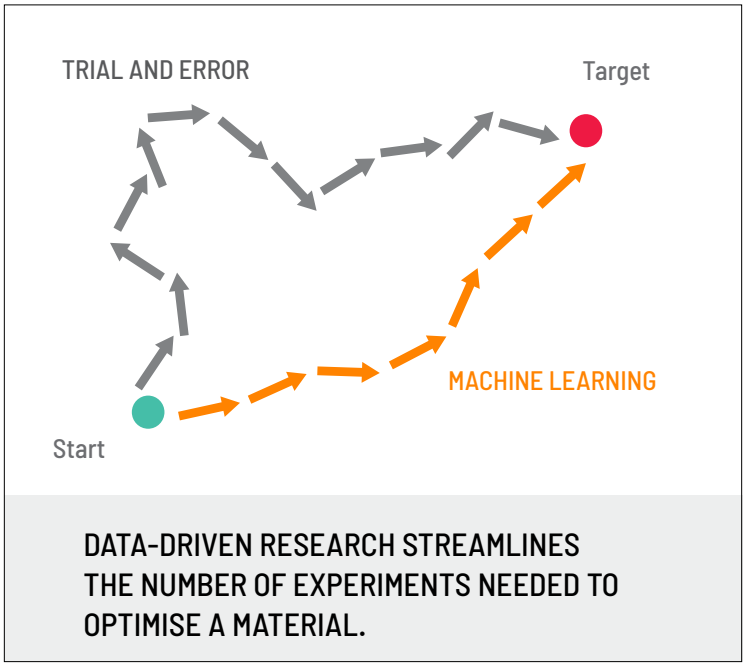
LOWER INITIAL INVESTMENT AND QUICKER TO RESPOND TO MARKET DEMAND



Creating and testing material samples or synthesizing chemicals is labor-intensive. It takes time – weeks and months. Even simulations and computational methods can take hours and days. Running an AI model takes minutes. AI models can guide researchers to the experiments that are most likely to bring success. Trial and error is replaced by a data-driven path.

Sequential Learning is the process by which an AI model is improved iteratively. The model is initially trained on available data. Citrine's platform then suggests which samples to test next, based on two factors. Their likelihood to be great candidate materials or the ability of data in that area to improve the uncertainty of the model. Suggested samples are made and tested and the results added to the platform and the model retrained. This process gets to high-performing candidates faster than trial and error.

ACCELERATED RESEARCH IMPROVES CUSTOMER RESPONSIVENESS AND CAN LEAD TO BEING FIRST TO MARKET.



CASE STUDY

DEVELOPMENT TIME REDUCED FROM YEARS TO DAYS

FIRST TO MARKET ADDITIVE ALUMINUM ALLOY

HRL LABORATORIES

"Once we told them what to look for, their big data analysis narrowed the field of available materials from hundreds of thousands to a select few. We went from a haystack to a handful of possible needles."

Brennan Yahata, HRL Laboratories

Read More

CASE STUDY

MACHINE LEARNING ACCELERATES MATERIALS DEVELOPMENT

ORGANIC ELECTRONICS - NEW DISCOVERY – PATENTS PENDING

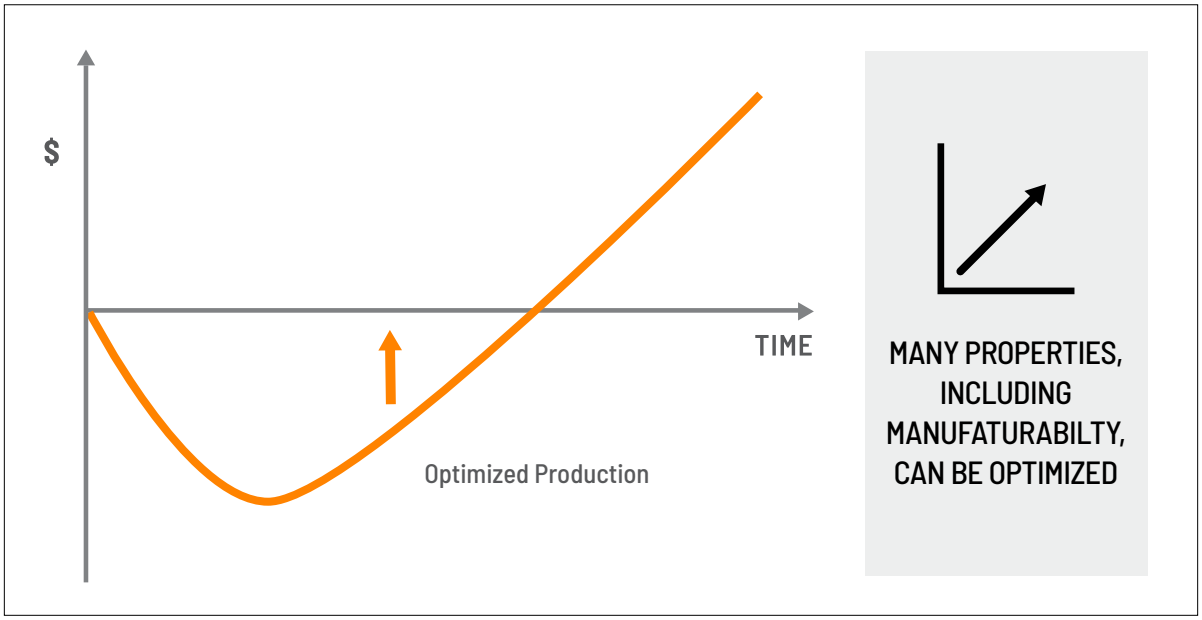
Panasonic

"This work demonstrates the utility of using the sequential learning methodology to design experiments for the discovery of novel materials."

Nobuyuki Matsuzawa, Panasonic

Read More

OPTIMIZE IN MANY DIMENSIONS – DESIGN FOR PRODUCTION



Citrine's platform helps to reduce production costs in 3 main ways. The first is that when creating the design space – the set of possible candidates that you are considering for experimentation – you can rule out those that do not meet manufacturability, supply chain or cost criteria. For instance, if experience tells you that a particular piece of equipment operates more reliably within certain parameters, you can eliminate candidates that are outside of those parameters. The second way is to optimize physical properties that are related to manufacturing cost, such as melting point (energy costs) and hardness (post processing costs). The third is to model costs from raw materials and weigh raw material costs against performance. If there is more than one way to achieve the desired physical properties, then understanding which one is least costly is important.

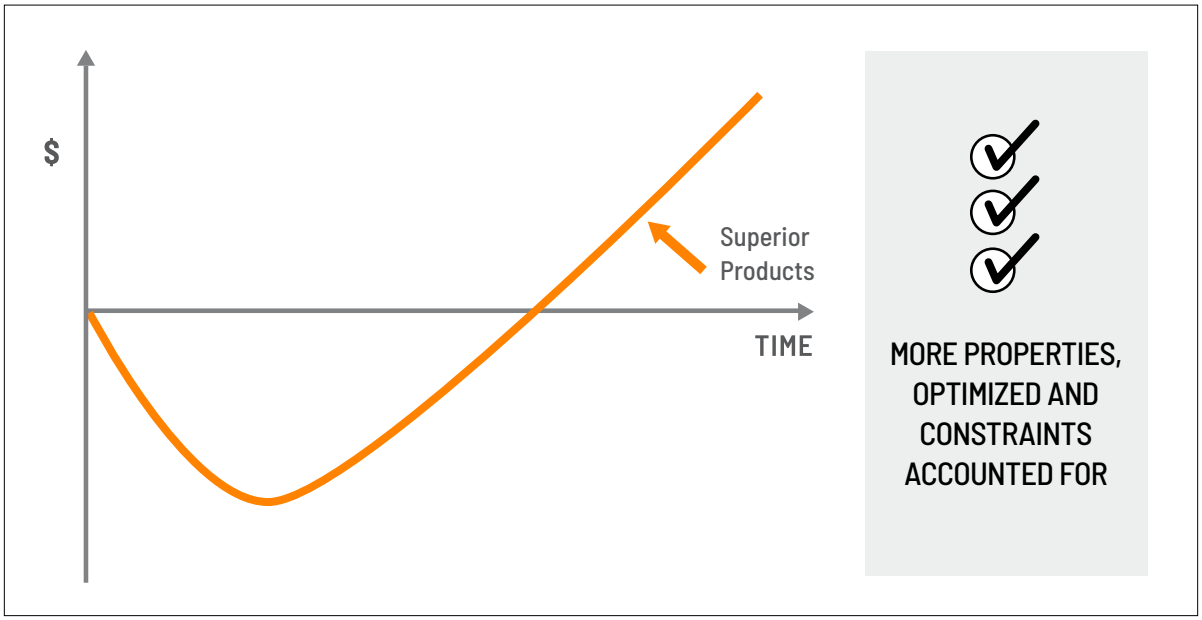
CASE STUDY

DATA-DRIVEN ASSESSMENTS DRIVE RESEARCH STRATEGY

A glass manufacturer was able to apply manufacturability constraints and assess the mechanical and optical properties achievable with current equipment across 11 different substrates in just 8 weeks.

Read More

OPTIMIZE PRODUCT PERFORMANCE FOR HIGHER MARGINS - AND LARGER MARKET SHARE



In order to achieve high margins, a well-differentiated product needs to meet a large number of customer requirements. An AI-driven data infrastructure can ensure that constraints are implemented consistently and more properties, be they physical, aesthetic, durability or cost-based are optimized systematically. Development teams that are freed up to deeply understand customer requirements producing products that are better than competitors, more quickly accepted and more valued by the market.

CASE STUDY

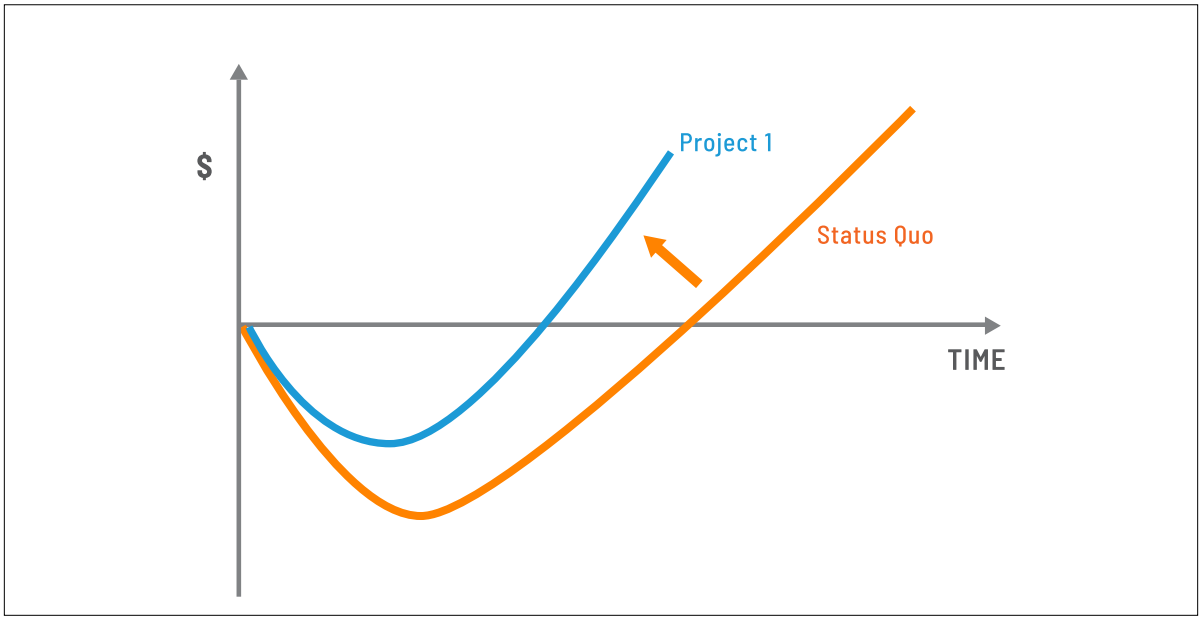
BETTER TAILOR-MADE FORMULATIONS, QUICKER

21% INCREASE IN MECHANICAL PERFORMANCE IN 10 MONTHS

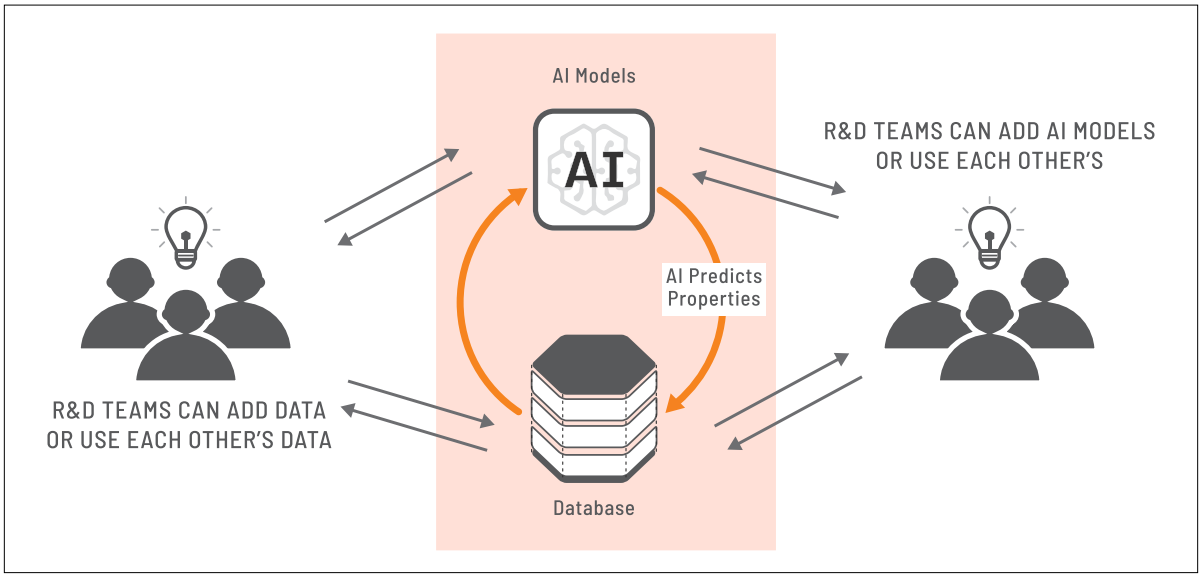
A global leader in specialty chemicals and plastics is employing a digital transformation strategy to enable them to win big contracts by dynamically responding to customer requirements. Their challenge was to increase the mechanical properties of a polymer, while maintaining the rest of its property profile.

Read More

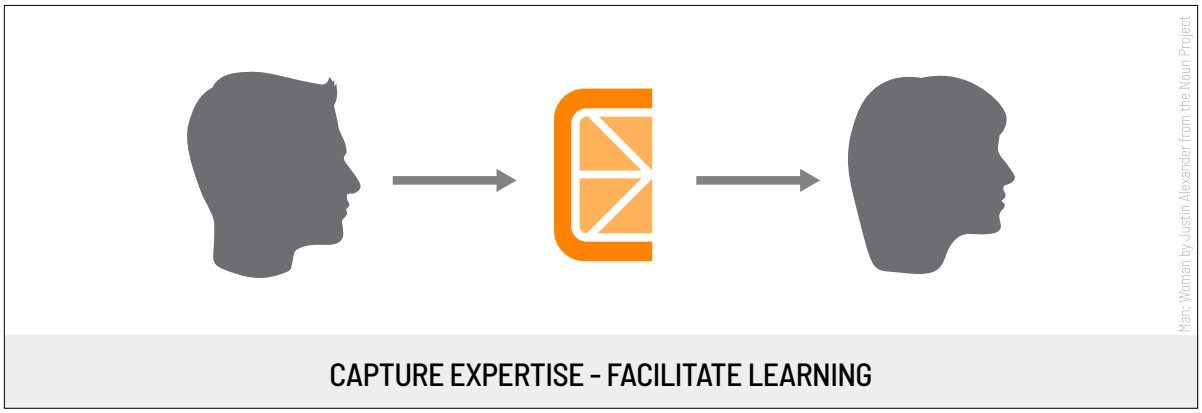
MORE PROJECTS MORE BENEFIT



By implementing a scalable Materials Informatics approach integrated into R&D team workflows, assets like data and models can be shared and reused across teams and sites. More data leads to better models that can more accurately predict properties and guide research. Instead of starting from scratch each time, models can be adapted to achieve new customer performance targets. The time needed to complete a project shrinks, allowing your R&D team to accomplish more with the same amount of resources.



MORE PROJECTS MORE BENEFIT

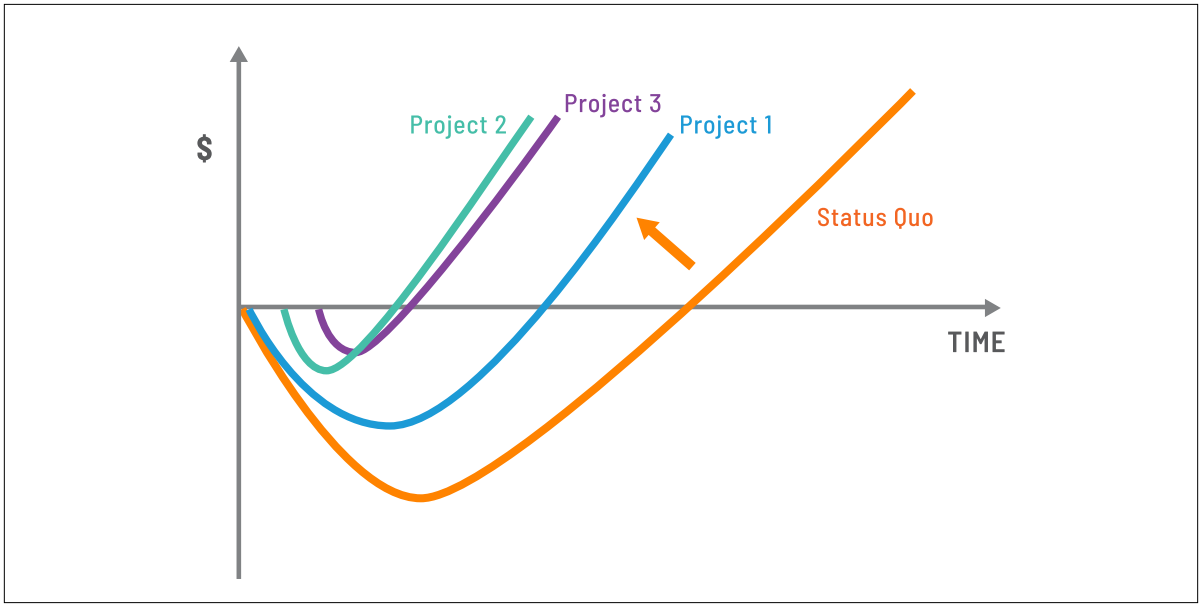


CAPTURE EXPERTISE - FACILITATE LEARNING

Lastly, the platform facilitates the capture and dissemination of domain knowledge across an organization. Experienced researchers can be involved in defining the design space or optimizing the AI model using known scientific analytical relationships. This expertise is then codified in the model and the platform and can be reused by more junior employees – not as a black box – but in a graphical way that will encourage learning.

As these synergies are exploited, the payback time on new product development reduces and profit increases.

RETURN ON INVESTMENT



FIND OUT MORE

ARRANGE AN ONLINE MEETING

DOWNLOAD MORE CASE STUDIES

LISTEN TO OUR PODCASTS

SUBSCRIBE TO OUR NEWSLETTER

ABOUT CITRINE INFORMATICS

Citrine Informatics is the award-winning materials informatics platform for data-driven materials and chemicals development. It won the 2017 World Materials Forum Start-up Challenge, the 2018 AI Breakthrough award as the "Best AI-based Solution for Manufacturing", and 2020 Cleantech 100 honors. The Citrine Platform combines smart materials data infrastructure and Artificial Intelligence, which accelerates development of cutting-edge materials, facilitates product portfolio optimization, and codifies research IP; enabling its reuse and preventing its loss. Citrine's customers include Panasonic, BASF, LANXESS, ACG, and some of the biggest and most respected names in the materials and chemicals industry in Asia, North America, and Europe. For more information visit our website at Citrine.io, or contact us at +1 650-276-7318.