## The perfect formula

Adapting chemical processing with autonomous systems



Traditionally, plant operators calibrate chemical reactors manually over the course of months to adjust for changing production needs—testing and tweaking multiple settings to achieve their optimization goal for that period.

Chemical processing is a balance of competing variables and goals.



changeover reactors and equipment to optimally produce new products. Autonomous systems offer chemical processing facilities a powerful AI equipped to assist, advise, or execute any number of tasks.

As a result, plant performance is significantly delayed while operators calibrate settings to



in the real world—drastically reducing calibration time and offering engineers, chemists, and operations managers a rapid and accurate solution for optimizing reactor performance.

By testing reactor optimizations inside a simulated

environment, an autonomous system can try millions

of options in a single day so it can easily make decisions



"



Reduce

out-of-spec production



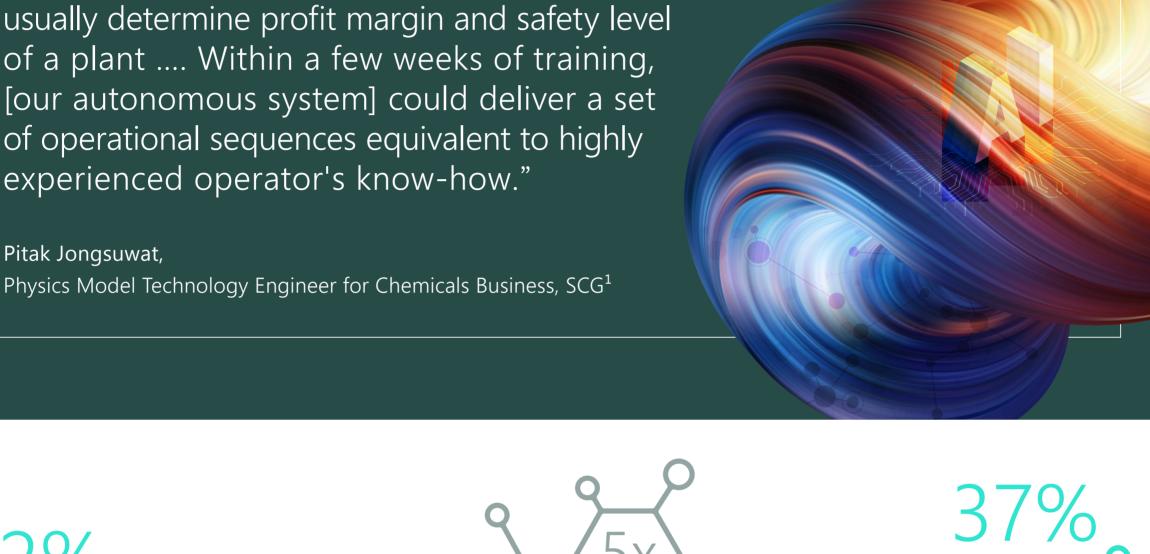


Drive

facility performance

[our autonomous system] could deliver a set of operational sequences equivalent to highly experienced operator's know-how." Pitak Jongsuwat, Physics Model Technology Engineer for Chemicals Business, SCG<sup>1</sup>

Experience and skills of a plant's operators



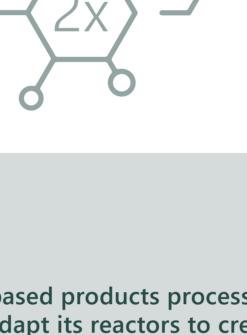
Autonomous systems in action

72%

With a regular rotation of different oil-based products processing through its reactors, Fabrikam, Inc. must regularly adapt its reactors to create the correct synthetic polymers. Every product within Fabrikam's wheelhouse requires a unique

of chemical processors saw at least

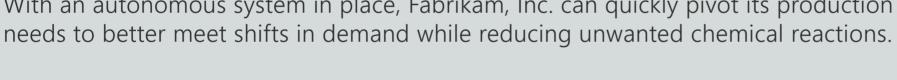
2x improvement after adopting an Al



5x after adoption<sup>2</sup>

saw performance increase

the manufacturer millions in out-of-spec product and potential safety hazards. With an autonomous system in place, Fabrikam, Inc. can quickly pivot its production



Manufacturers that adopt autonomous systems can increase production by 20%.3

balance of chemicals to produce—a balance that, if not measured correctly, can cost



The AI can then perfect those methods

With a supporting AI, new hires and less

seasoned chemical professionals can

confidently perform more advanced

tasks on the factory floor.

inside a simulated environment where it combines, adapts, and revises techniques to test millions of transition scenarios.



Simulated environments create

ideal testing conditions for new

methodologies and formulas

without risking operator safety.

By testing potential variables inside a simulated environment, autonomous systems can reduce calibration time from months to days.



wasted resources help ensure a more

sustainable and efficient operation.

A more controlled and predictable chemical reaction delivers a more consistent final product.



Production and quality assurance account

for 47% of modern Al implementations.4

case selection guide.

Get the e-book

Reductions in out-of-spec polymers and

production and safety goals. To learn more about getting started, contact a Microsoft autonomous systems expert →



With improved autonomy measures in place, chemical

manufacturers can transform their facilities to exceed

or download our e-book: Get started with

autonomous systems: A manufacturer's use

1. SCG optimizes chemical plant operations with Microsoft autonomous systems. Microsoft. 2020 2. Chemical companies ready to seize Al opportunities. Accenture. 2018 3. Bringing Autonomy to industrial Control Systems. Microsoft. 2020 4. Scaling Al in Manufacturing Operations: A Practitioners' Perspective. Capgemini Research Institute. 2019 Microsoft

A manufacturer's use case selection guide

Get started with