

Results

Prototypes

Solutions

Trends

Systems

Overview



PRESENTED BY
DR B.I. RAMATSETSE

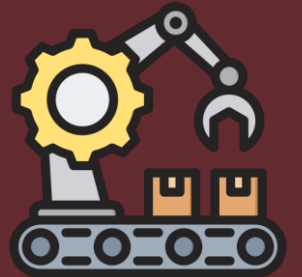


Stellenbosch Engineering Industry Showcase

21st May 2025

Sandton Hotel, Johannesburg

Next Generation Manufacturing Systems



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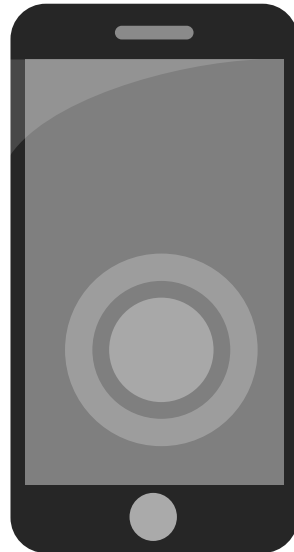
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OVERVIEW



CHANGING CONSUMER DEMANDS

There is a need for next generation of manufacturing systems (NGMS) that can respond to change in demand, enabling companies to meet customer needs in real-time

ONE



MASS CUSTOMIZATION

There is a need for next generation of manufacturing systems (NGMS) **should be able to produce a wide variety of customized products** at lower cost.

TWO



SCALABILITY

There is a need for next generation of manufacturing systems (NGMS) that can scale production capacity up or down adding/removing machine modules.

THREE



RESILIENCE TO DISRUPTIONS

There is a need for next generation of manufacturing systems (NGMS) should be able to recover quickly for failure by swapping or reconfiguring parts without needing a complete shutdown.

FOUR



Overview

DEDICATED SYSTEM



DMS

System based on fixed automation and **produce products or parts at high-volume**. Each dedicated line is typically designed to produce a single part (e.g., specific engine block) at high production rate.

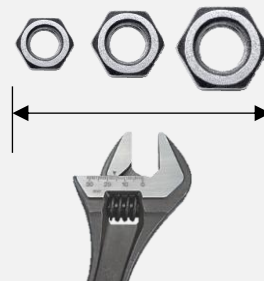


FLEXIBLE SYSTEM



FMS

A flexible manufacturing system is a manufacturing system in which there is some amount of flexibility **that allows the system to react in case of changes, whether predicted or unpredicted**.



RECONFIGURABLE SYSTEM

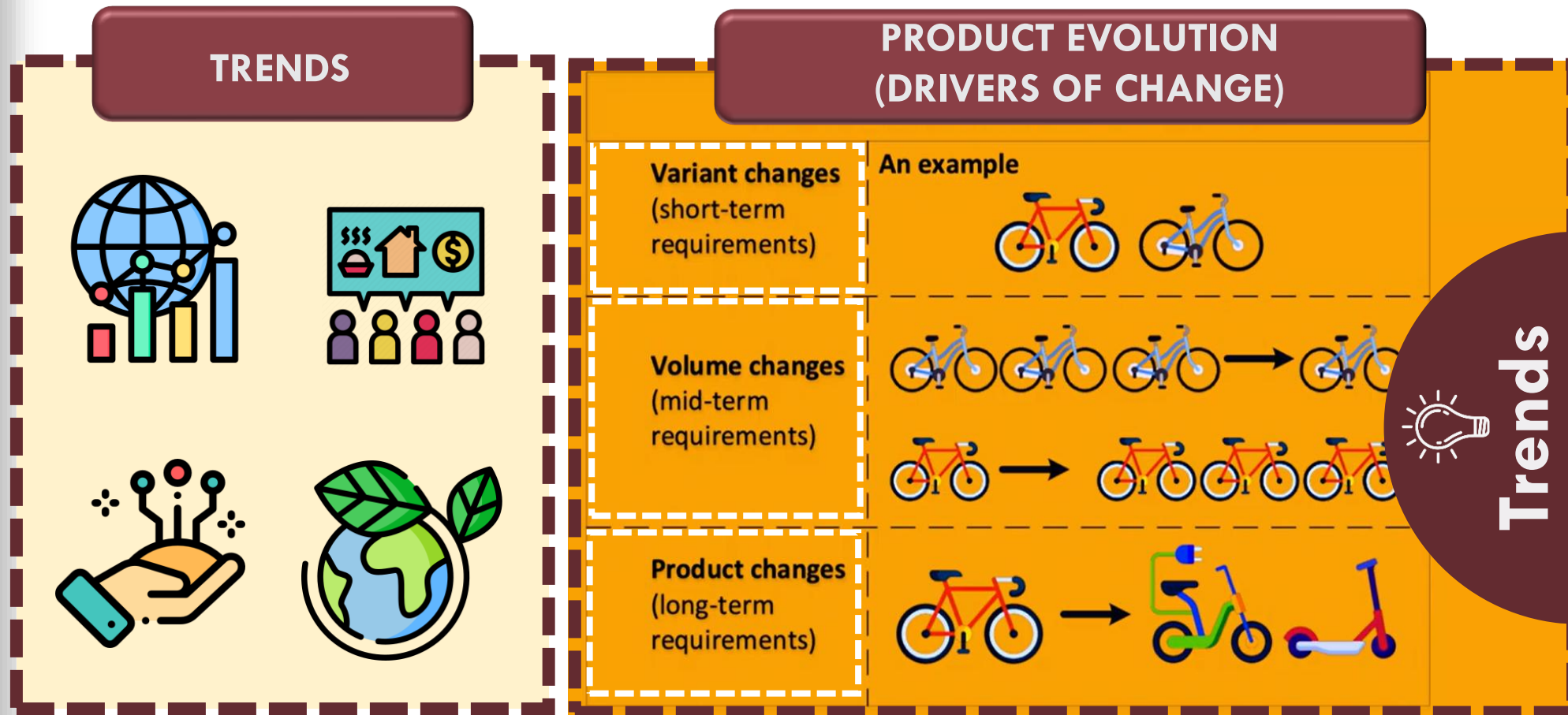


RMS

One designed at the outset for rapid change in its structure, as well as its hardware and software components, **to quickly adjust its production capacity and functionality within a part family in response to sudden market changes**.

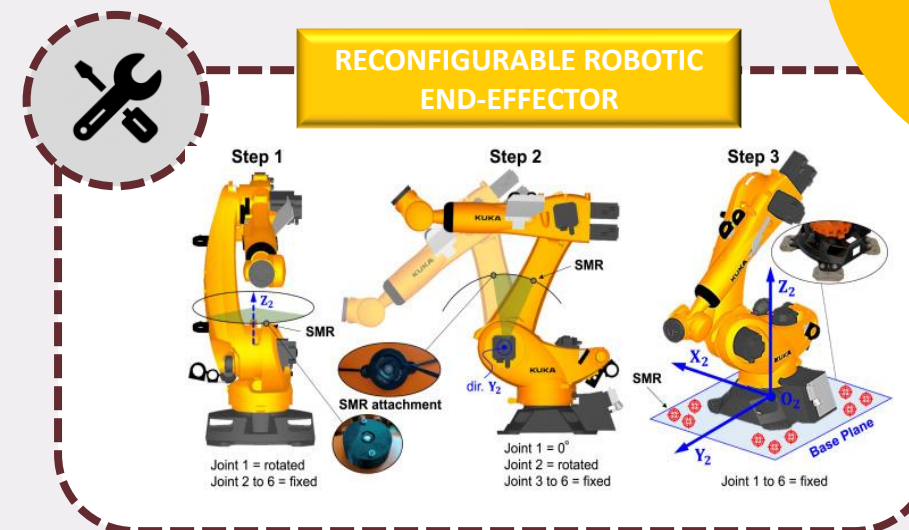
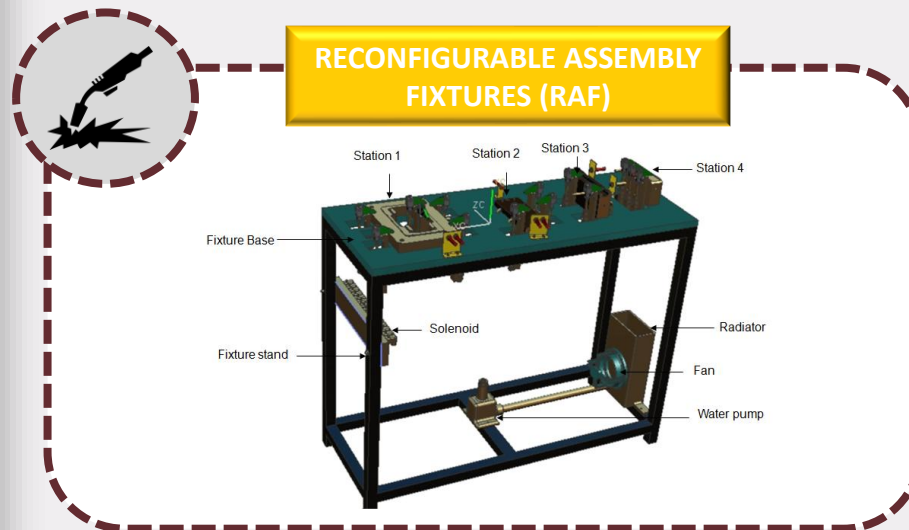
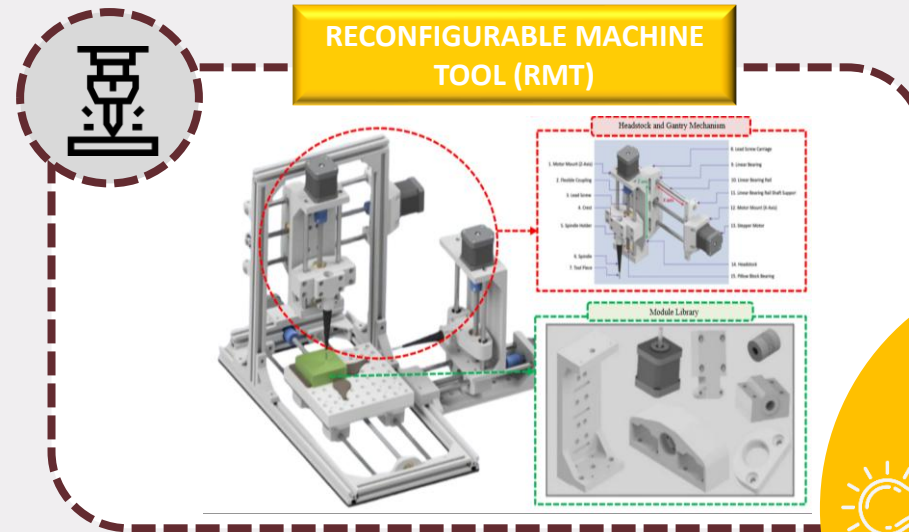
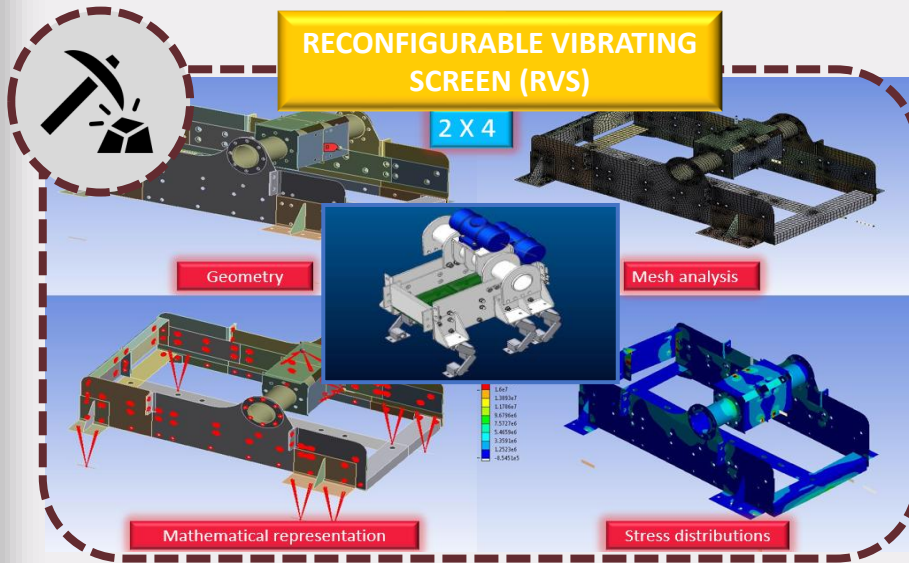


ADDRESSING TRENDS WITH NEXT GENERATION MANUFACTURING SYSTEMS



Source: Andersen et al. 2024

DESIGNED MACHINE SOLUTIONS



Solutions

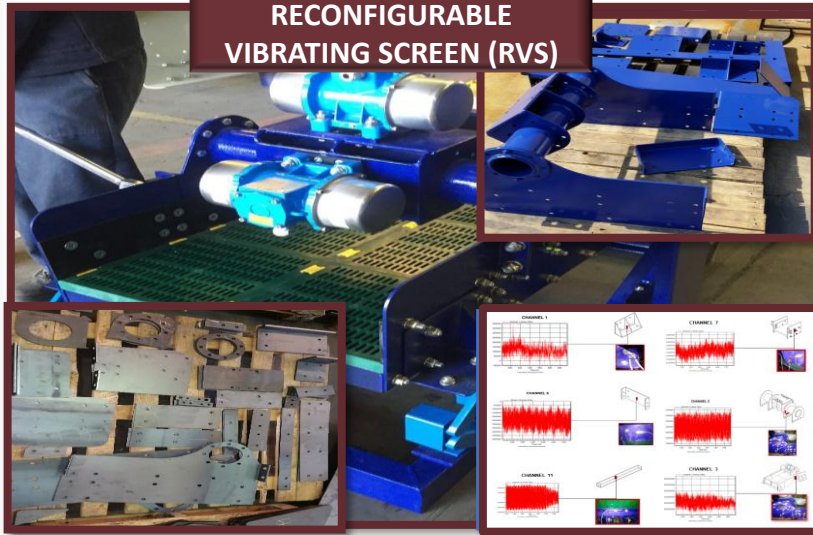
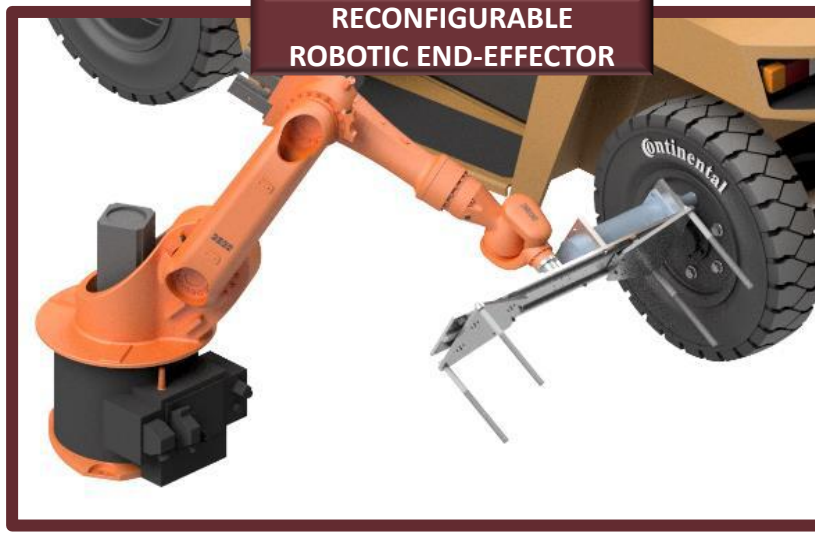
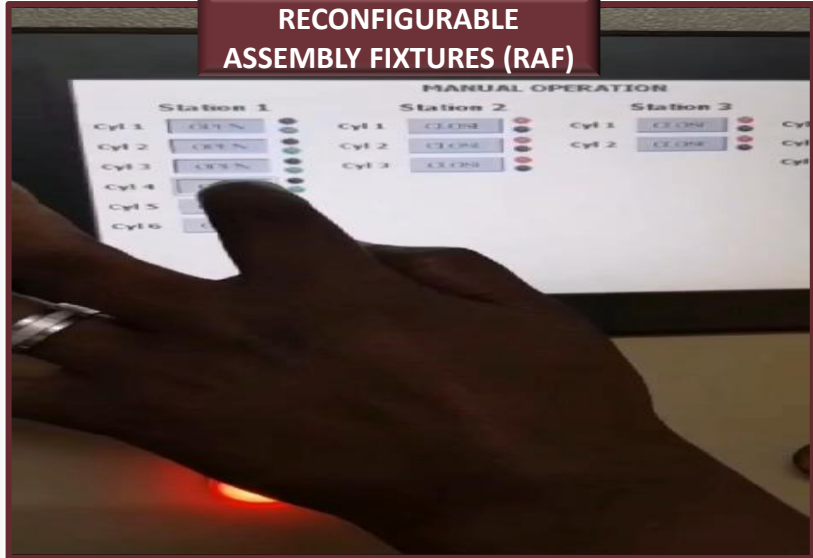
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"A Design Isn't Finished Until Somebody Is Using It." - Brenda Laurel

RMS PROTOTYPE MACHINE SOLUTIONS

RECONFIGURABLE
VIBRATING SCREEN (RVS)RECONFIGURABLE
ROBOTIC END-EFFECTORRECONFIGURABLE
ASSEMBLY FIXTURES (RAF)RECONFIGURABLE
MACHINE TOOL (RMT)

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RMCERI
INCUBATION HUB



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Manufacturing
Partners



**THANK
YOU**

**BAIE
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Dr Boitumelo Innocent Ramatsetse



2021 NSTF-South32 Award Winner: TW Kambule-NSTF Emerging Researcher



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