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**Localised automation and robotics  
solutions, using a lean and agile  
R&D innovation process**

Mr Peter Bosscha

Contributions by: Mr Pieter Roux  
Mr Delon Mudaly  
Mr Riaan Coetzee

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# CONTENTS

- South African context
- The need
- Our approach
- Case study
- Conclusion

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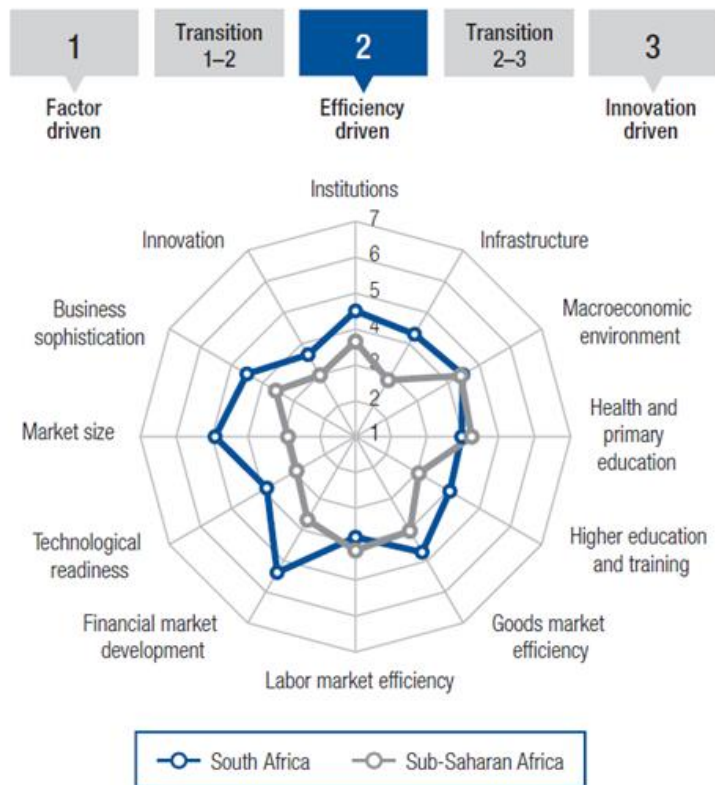
# South African context

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# South African context

## Stage of development



- Ranked 56th in the world
- Key problem areas: labour market efficiency, innovation and technological readiness
- 1% of GDP in R&D → need to increase to 3% of GDP
- What is our competitive advantage?
- Need to transition from **Factor driven** economy to **Innovation driven** Economy
- Focus on new product development and production efficiency of our manufacturing industry

# The need

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# The need(1)



*Typical linear innovation process*

- If R&D spending is to increase how do we ensure its impact?
- Innovation process needs to be seen as a system with multiple actors and stakeholders
- New technologies and products need to be integrated into existing and future eco-systems
- Development of new technologies and products cannot be done in isolation

# The need(2)

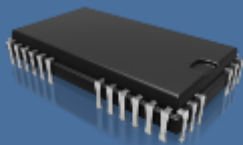
Technology

Product

User

Funder/Stakeholder

Impact/Need



# Our approach

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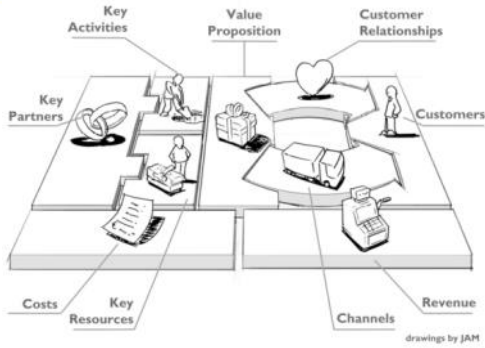
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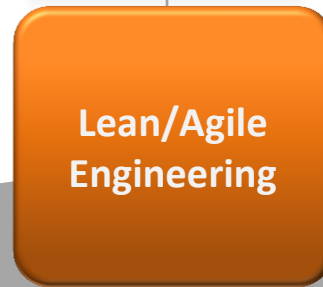
# The Lean Agile R+D Development

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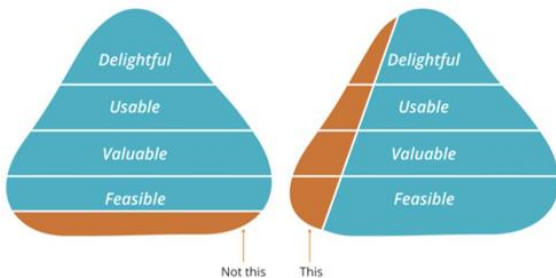
Business Model Canvas/ Lean Canvas

Product / Market Fit

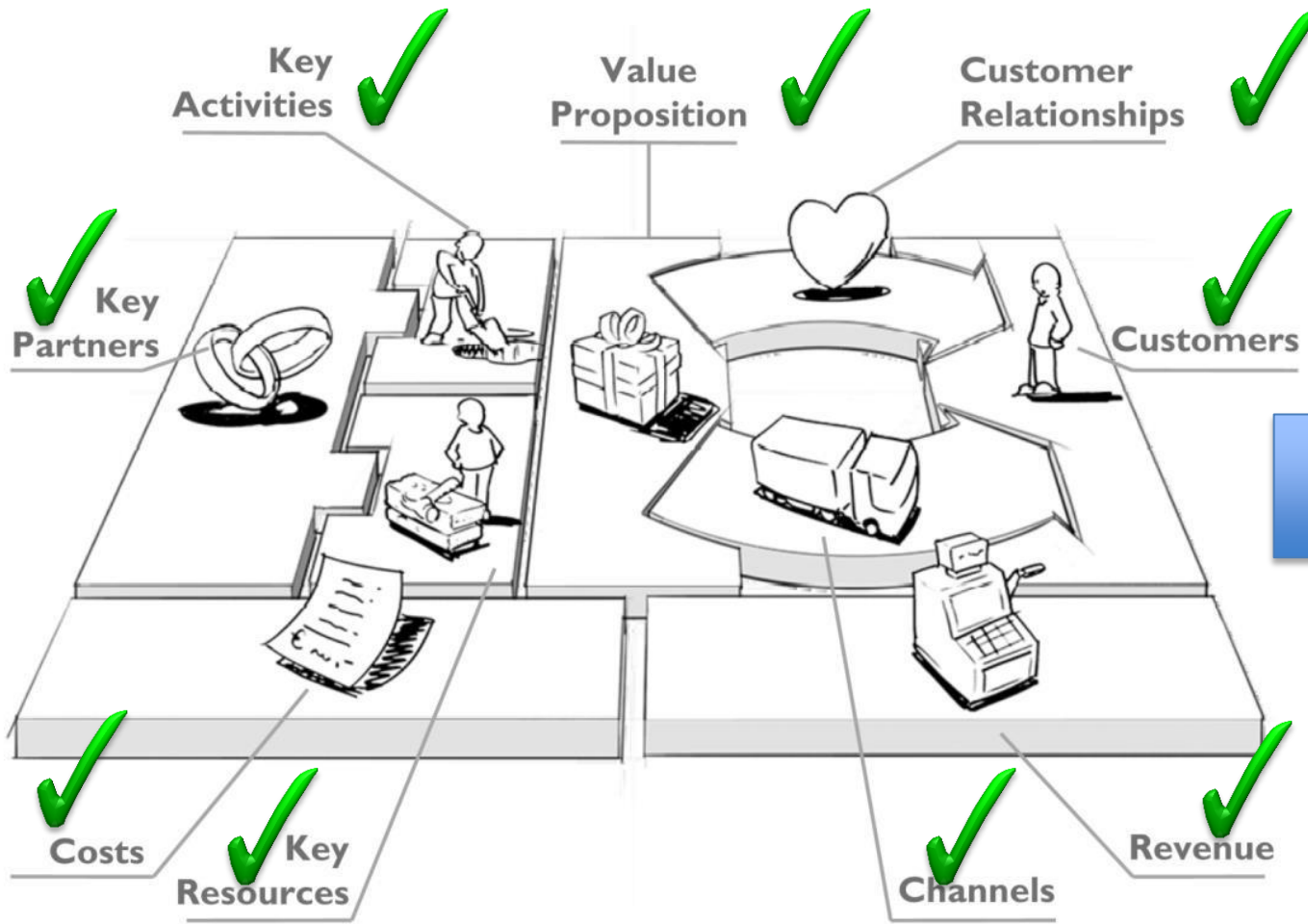


Technology Development – “Validated Learning”

MINIMUM VIABLE PRODUCT



# Business Model Canvas



Business Model

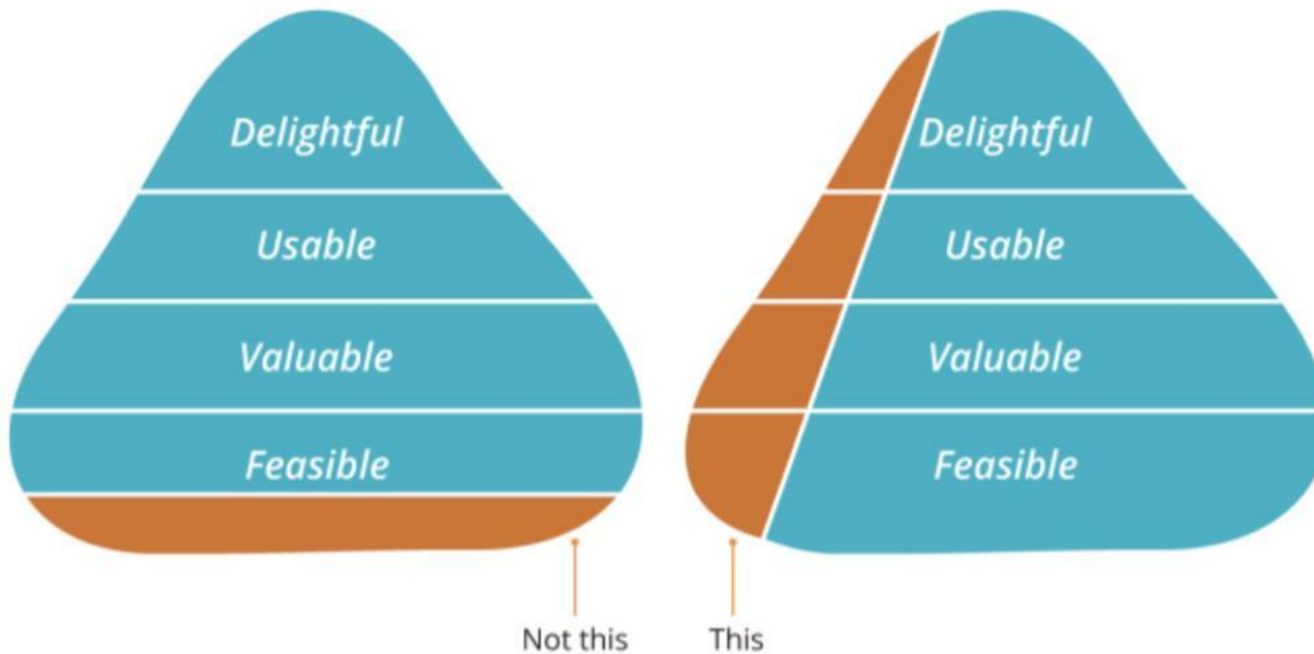
What is the product?

Source: Dr Alexander Osterwalder

# Minimum Viable Product (MVP)

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## MINIMUM VIABLE PRODUCT



# Customer Development

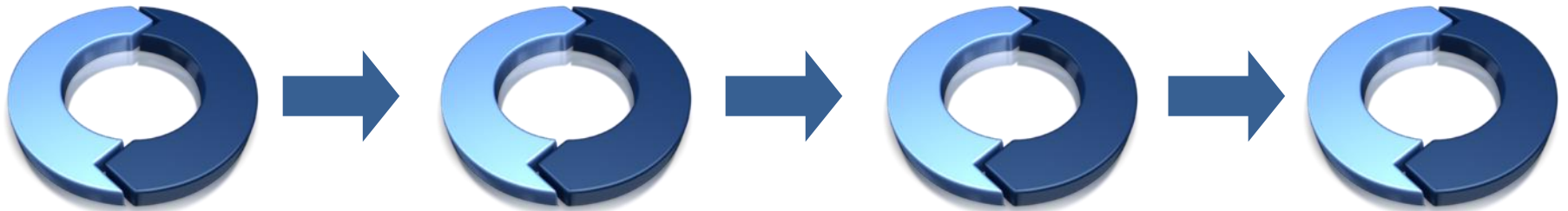
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Customer  
Discovery

Customer  
Validation

Customer  
Creation

Company  
Building



Pivot  
Hypothesis  
Testing

## The Four Steps to the Epiphany

Successful Strategies for  
Products that Win



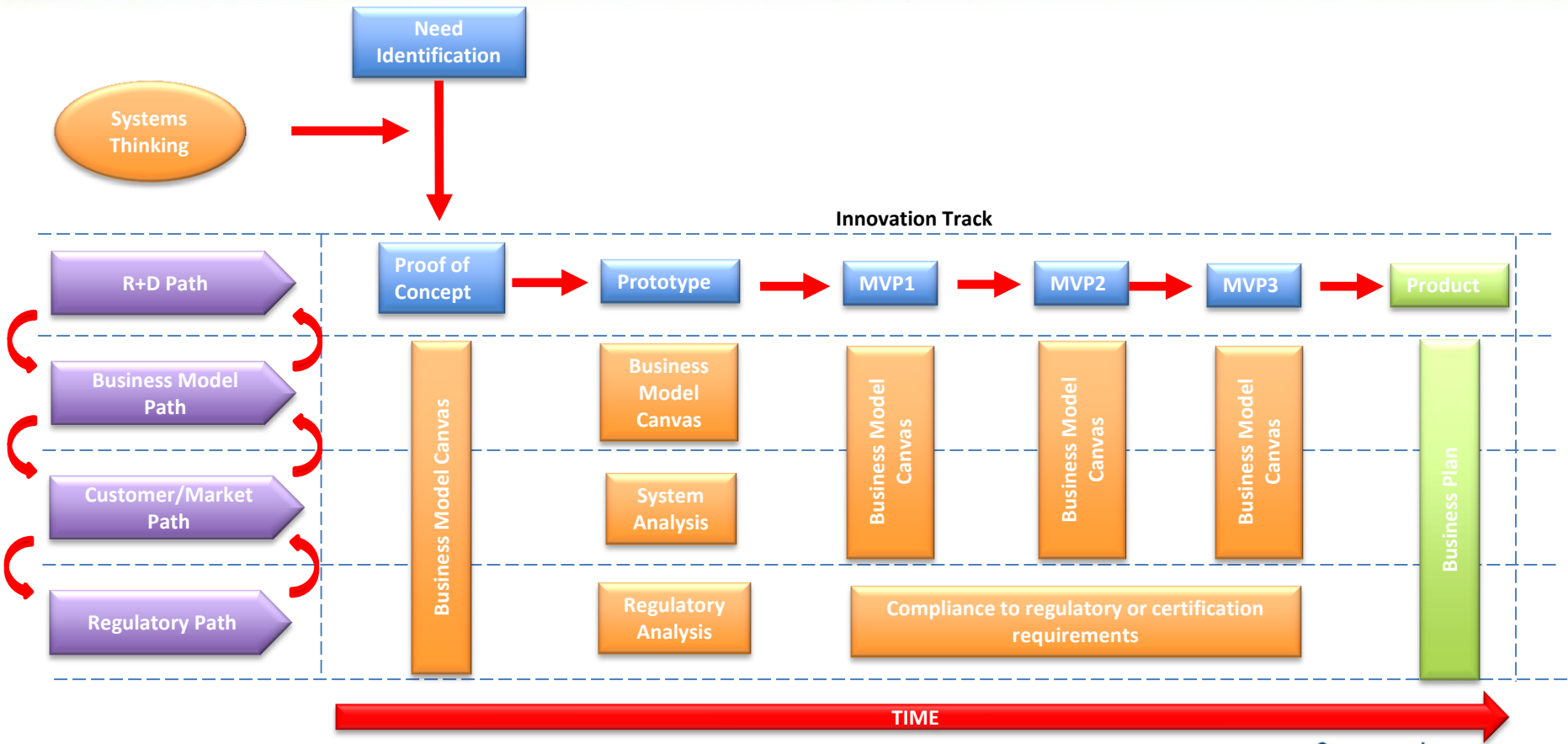
Steven Gary Blank

Customer  
Development

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# LARD Innovation Process



# Case study

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# Mining Automation

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- Opportunity exists for a robot deployment in SA mines
- No doubt it will have the potential to improve safety
- Use small machines to do the dangerous work
- Not drill and blast cyclical mining
- 24hours/day 7days/week continuous mining of every stope



Assay/Mapping Robot



support



cleaning



Stope Recon



recovery



miner



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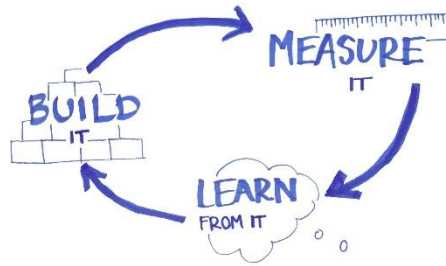
# Mining Automation Concept

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## Concept



MVP1



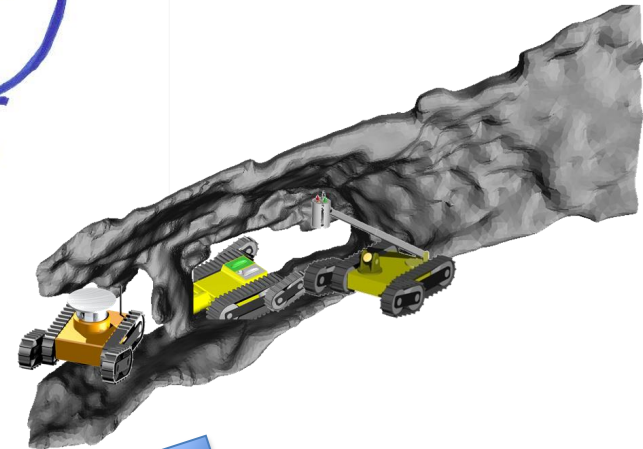
MVP2



MVP3



MVP4





# Mining Automation: MVP 1

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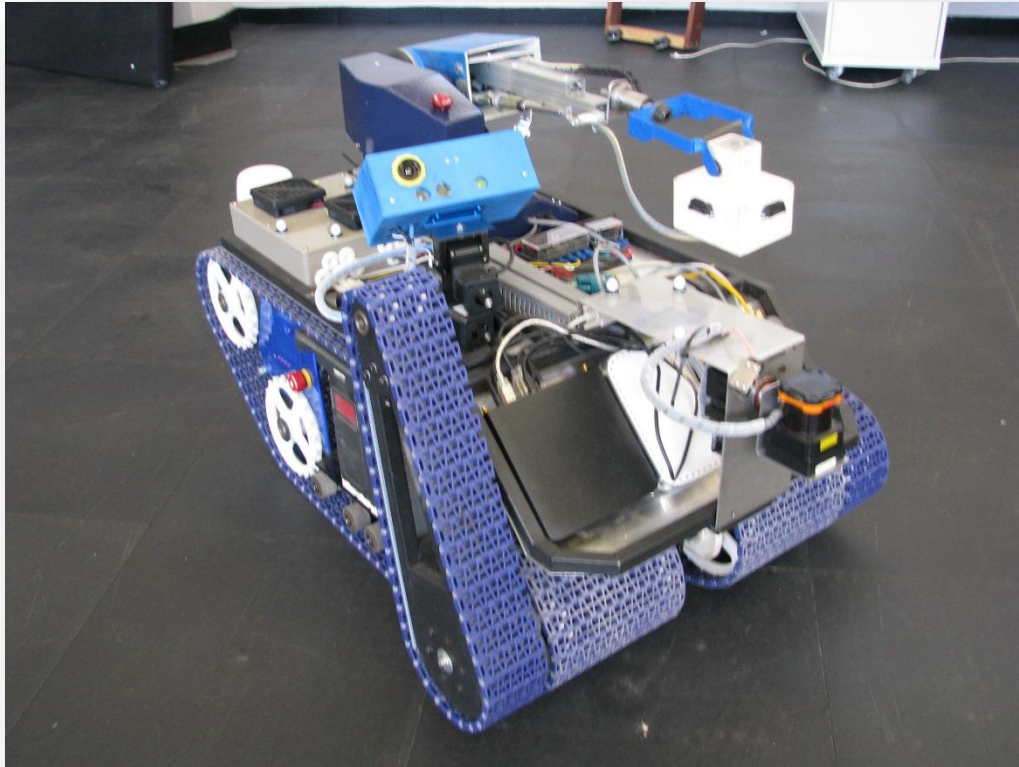


- **Build:** Focus was on rugged vehicle that can overcome any obstacle
- **Measure:** Test in rocky areas went well, failed against 40 degree slopes
- **Learn:** Improved design required that can scale 40 degree slopes with rocks
- **Other:** Inputs and impact of tests have changed design requirements

**MVP 3 in Progress**

# Mining Automation: MVP 2

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- **Build:** Focus on traction at 40 degree slopes with obstacles
- **Measure:** Rocky terrain and artificial mining slope works acceptably, some modifications required
- **Learn:** Ambient operating conditions like temperature and humidity needs to be factored. Intrinsic Safety and Flame-proofing as per regulatory requirements needed
- **Other:** As we developed further, new stakeholder requirements emerged

# Conclusion

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# Conclusion

- Co-development with stakeholders, customers is a must
- Build a prototype as soon as possible and test in real environment
- Use feedback to improve on existing platform
- Be agile enough to exchange good ideas for better ones
- Embed yourself in your customers problems, walk in his shoes!
- Funding will follow good ideas and projects
- Impact is only achieved when implemented
- Team South Africa Approach!



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Thank you

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