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
CONTENTS

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

- 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

*Source: WEF Global Competitiveness Report 2014-2015*
The need
The need(1)

- 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
Our approach
The Lean Agile R+D Development

Business Model Canvas/Lean Canvas

Customer Development

Product/Market Fit

Technology Development – “Validated Learning”
What is the product?

Source: Dr Alexander Osterwalder
Minimum Viable Product (MVP)
Customer Development

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
LARD Innovation Process

Innovation Track

1. Need Identification
2. Proof of Concept
3. Prototype
4. MVP1
5. MVP2
6. MVP3
7. Product

R+D Path

- Business Model Canvas
- System Analysis
- Regulatory Analysis
- Compliance to regulatory or certification requirements

Business Model Path

- Business Model Canvas

Customer/Market Path

- Business Model Canvas

Regulatory Path

- Business Model Canvas

TIME
Case study
Mining Automation

- 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
- 24 hours/day 7 days/week continuous mining of every stope
Mining Automation Concept

Concept

MVP1 → MVP2 → MVP3 → MVP4
Mining Automation: MVP 1

• **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

- **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
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!
Thank you