Kick-Starting Economic Growth in Developing Countries

Leveraging Technology to Eradicate Poverty

ApproTEC

- Martin Fisher & Nick Moon, founders
- Participated in development failures
- Identified a revolutionary way to alleviate poverty
- Founded ApproTEC - Appropriate Technologies for Enterprise Creation
  - Started in Kenya in 1991
  - Develops and promotes low cost technologies that are bought by thousands of people in East Africa and used to start profitable businesses
  - Market driven solution with no handouts

Super MoneyMaker Pressure Irrigation Pump

ApproTEC Impact Creating a Middle Class

POVERTY

The average Kenyan farm income = $120/year

MIDDLE CLASS

With a MoneyMaker Pump, the average farm income = $1200/year

Impact to Date

The ApproTEC difference….

- 35,000 new businesses created to date
- 800 new businesses created every month
- $37 million annual profits & wages generated
- New revenues generated equivalent to:
  - > 0.5% of Kenyan GDP (equivalent to Microsoft + Cisco as % US GDP)
  - > 0.2% of Tanzanian GDP

These impacts are measured through a rigorous process, and are validated by third parties.

ApproTEC only succeeds if our beneficiaries earn a lot of money…

Poverty in Sub-Saharan Africa

The poorest region in the world with many failed states

- 70% less than $1 per day
- 40% go to bed hungry
- 10% have 90% of wealth

Rural poverty 80%:

- No middle class
- Poor governance
Developing World Economies

<table>
<thead>
<tr>
<th>Subsistence/controlled Economy</th>
<th>Market Economies</th>
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<tbody>
<tr>
<td>Basic Human Needs</td>
<td>Food, farm inputs</td>
</tr>
<tr>
<td>Subsistence farming</td>
<td>Education, healthcare</td>
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</tbody>
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People need to make money!

Jobs in Africa

- **Formal sector**
  - 13% of the labor force in Kenya
  - 7% of the labor force in Tanzania
- **Informal (survival) sector**
  - 70% petty trade
  - 25% tailoring, carpentry, metalwork

Entrepreneurs

- 90% poor
- Save or borrow - $30 to $500

But

- What business to start?
- Can’t access technology

ApproTEC’s Unique Approach

Act like a business, not like a charity

1) Identify profitable new business opportunities
2) Design the required new capital equipment
3) Establish the supply chain for the new equipment
4) Develop the market for the new equipment
5) Cease marketing subsidies

Throughout process:
- Measure impacts & collect market intelligence

Stage 1: Identify Business Opportunities

Market studies to identify business models that:
1) Break even in 3 months
2) Large market size (thousands of businesses)
3) Environmentally sustainable
4) Low initial investment ($30 to $500)

**EXAMPLE:** Typical African
- Land is only asset
- Farming is primary skill
- High demand for off-season fruits & vegetables

Need for a low cost, manually-operated irrigation pump

Stage 2: Design Required Equipment
Stage 3: Establish Supply Chain

MANUFACTURER \( \rightarrow \) WHOLESALE \( \rightarrow \) RETAILER

- Unique product
- High price
- Risk averse buyers

Stage 4: Develop Market for the Capital Equipment

A Revolutionary Approach to Development
ApproTEC’s market-driven solution to poverty

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Stage 5: Cease Marketing Subsidies

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<table>
<thead>
<tr>
<th>Failure</th>
<th>Success</th>
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<tbody>
<tr>
<td>$</td>
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<tr>
<td>Marketing</td>
<td>Marketing</td>
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<tr>
<td>$</td>
<td>$</td>
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<tr>
<td>Sales</td>
<td>Growing Sales</td>
</tr>
<tr>
<td>Time</td>
<td>Time</td>
</tr>
</tbody>
</table>
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“Tipping point” at 20% market penetration
- Growing sales and impacts
- Fully sustainable supply chain & retail network

Impacts of ApproTEC
Throughout history new technologies & new markets have boosted development...

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...families can now afford
- Nutrition
- Education
- Healthcare
- Housing
```

which leads to...
- A middle class
- Thriving local economy
- Stronger democracy
- Better governance
- More investments

Successful States

MoneyMaker Irrigation Pumps

- Super-MoneyMaker - $75
- MoneyMaker-Plus - $38
Deep Well Pump

- Designed with IDEO
- 60 feet deep
- 40 feet high

Manual Well Drilling

- Drilling through soft ground

Manual Well Drilling

- Drilling through hard ground and rock
- 1 meter/hour

Oilseed press

Stabilized Soil Block Press

Manual Hay Baler
### Manufacturing in Africa

- Limited, poor quality materials
- Undercapitalization/minimal equipment
- Lack of skilled labor
  - High labor cost
- Inexperienced management
- Little experience in mass production & QC
- Low productivity
- Undercapitalized for raw materials
- Brown outs
- Infrastructure/supply chain
  - Raw materials and finished goods

### Manufacturing in Africa: Materials

- **Mild steel**
  - Sections, plates & rods
  - Mostly cold rolled
- **Chains**
- **Cables**
- **Alloys & stainless are expensive**
- **Very little aluminum, copper**
- **Quality**
  - Dimensions
  - Strength
  - Consistency
  - Tolerances
  - Straightness
- **Wood**
  - Not cured, mainly soft
- **Little plastic**
  - PVC & HDPE pipes and some fittings
  - Water tanks
- **Simple molded rubber**
  - Compression molding
- **Little glass**
- **Ropes**
- **Alloys & stainless are expensive**
- **Very little aluminum, copper**
- **Quality**
  - Dimensions
  - Strength
  - Consistency
  - Tolerances
  - Straightness

### Manufacturing in Africa: Tools

- **Basic tools**
  - Power saw
  - Grinders
  - Arc welders
  - Gas welders/cutters
  - Hand tools
  - Blacksmith
- **Advanced tools**
  - Lathe
  - Punching/stamping
  - Bending
  - Shears
  - Milling or shaping
  - MIG/TIG welding
  - Spot welding
  - MIA
    - Forging
    - Casting
    - Large presses
    - CNC
    - Injection molding

### Designing Tooling and Process

- **Materials and dimensions**
  - Parts will not be identical
  - Determine critical datum
  - Complicated jigs and fixtures
- **Distortion control – arc welding**
  - Order of welding is critical
  - Design jigs for distortion (where to clamp)
  - Removing the part
- **Forming**
  - Complicated process to compensate for simple tools

### Production Start-up

- Design and build jigs and fixtures
- Mass production training – two weeks
- Six months follow-up on production and QC
- We do the final QC
ApproTEC’s 3-Year Objective

Sell 100,000 irrigation pumps, primarily in Eastern Africa region...

Recognized Leader
An innovator in international development

Awards:
- The Gleitsman Foundation Award - Oct 03
- International Prize for Pioneering Development Projects - AGFUND - Sept 03
- Time Europe - European Hero Award April 03
- Schwab Outstanding Social Entrepreneurs - Jan 03
- 2002 Innovation Association contest winner – Nov 02
- 2002 San Jose Tech Museum Award – Sept 02

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