

# Manufacturing for the other 90%

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## **Manufacturing for the other 90%**

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- Poor city people in Kenya may spend 30% of their income on public transportation.
- Boda-Boda bicycle taxi/messengers fill a vital role in Kenyan transportation
- The Boda-Boda is just a plain bicycle, not well suited to bulky or heavy loads.
- Worldbike.org set out to make a cargo extension to Kenyan bicycles to improved transportation for the lower class.

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- The Worldbike “Big Boda” moves the rear wheel back about 15” and provides a heavy-duty rack mostly forward of the rear wheel.
- The “Big Boda” was designed, prototyped, and tested in the US, then plans and prototypes were taken to Kenya

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- Worldbike went to Kenya in May 2005 to find mfg facility
- Chose Kisumu, 3rd largest city w/ significant industrial sector.
- Recruited project lead in Nairobi through newspaper ad and 250 interviews
- Leased a workshop from an established metalworking firm that services large machinery for the tea industry.

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- Spent 3 months refining design, and building jigs and fixtures.
- Discovered that the local bikes (nicknamed “Black Mambas” for their tendency to hurt their riders) were prone to failure, had brakes that were ineffective with heavy load or rain, and that a low hill-climbing gear was needed but not available.

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- Solution was emergency foot brake option, identification of the best of the (bad) brand options, and special ordered chainrings.
- Manufacturing startup problems:
  - Indian merchants who owned machine shop didn't trust Kenyans and wouldn't allow them in the shop.
  - The American technical lead couldn't produce the desired 50 Big Bodas, so there wasn't any inventory until month 6.

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- In month 8, production was moved to a low-rent district shop run by Kenyans.
- The new area had many small-scale mfg and repair operations
- New production shop was a steel furniture mfg that used woven seat pads and backs.
- Worldbike invested \$1000 in tools and safety equipment.
- The Nairobi-hired project leader was dumped and production shop employees sent out on the Big Bodas for marketing.
- It took only 7 weeks for second batch of Big Bodas (30 units)

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- Problems:
  - Big Boda extensions were strong, Black Mamba bikes were not. Average boda-boda operator spends 300KSH (\$5)/month on repairs
  - market limited to transporters of light, bulky loads (bread, flowers, school children)
  - better quality bikes must be imported, along with repair parts, so might as well make one-piece Big Boda bike.

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- Donated Big Bodas were very successful
  - orphanage saves \$5/day in reduced public transportation costs
  - clinics found Big Boda to make excellent village ambulance (except for weak bike again)
- Sales of Big Bodas were more difficult, due to necessary high price

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- Costs:
  - 10 man-hours to fabricate and install
  - cost of materials, labor and overhead is 2200 KSH for extension, or 7000 KSH for complete bike + extension.
  - modest 14% profit raises price to 2500KSH (US \$37) or 8000KSH (\$120) for complete bike.

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- Conclusion:
  - Big Boda is solid, useful product
  - Unfortunately it doesn't address the three universal problems faced by Kenyan cyclists:
    - poor brakes on ordinary bikes
    - not geared low enough for hill-climbing
    - poor overall durability (bad bottom brackets, poor tires, soft nuts and bolts, weak forks, bad pedals)
  - Therefore, Big Boda only offers value in niche markets (light, bulky, high-value loads)
  - Better bike is needed, either as 1-piece Big Boda or for extension to be added to.

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- Worldbike
  - A prototype one-piece Big Boda bike was tested in Kenya, and response was fantastic. Half the people who tested in offered to buy it on the spot. Unfortunately, the quality materials used in it are not available in Africa.



















