COLLABORATIVE ROBOTICS:

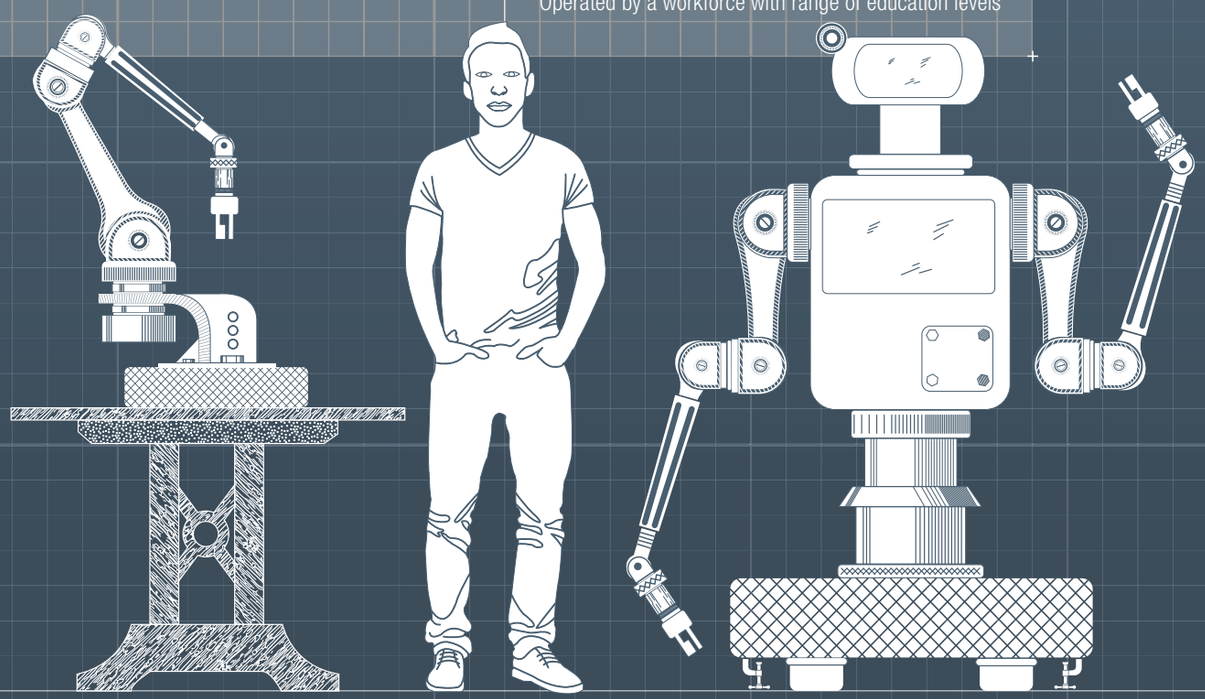
Market Opportunities

REPRESENTATIVE TECHNOLOGIES

6 or 7 DoF articulated arms
Force sensing / force control
No pinch points / sharp edges
Programming by demonstration
Lightweight construction / new materials
Integrated sensors (torque, vision, sonar etc.)
Software centricity / intelligence / "perception"
Compliant / gravity compensated / backdrivable arms

OPERATIONAL CAPABILITIES

Relatively low cost / rapid ROI
Programmed easily and quickly
Rapid deployment and integration
Lightweight systems / small footprint
Human scale size and operating range
Work safely and effectively with humans
Lower power / maintenance requirements
Versatile, supports multiple automation tasks
Operated by a workforce with range of education levels



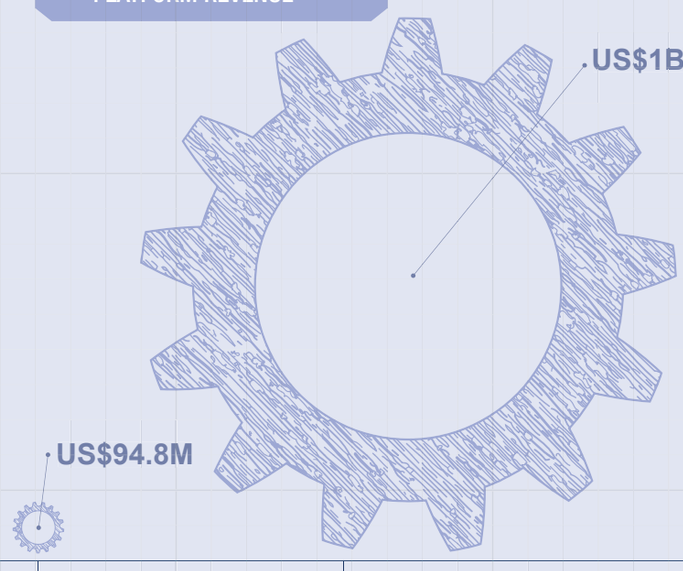
BUSINESS DRIVERS

Offset increase labor costs
Increase automation levels
Reduce automation costs / risks
Overcome labor pool variability
Increase manufacturing agility / flexibility
Introduce new products/applications / markets
Support variable production / mass customization
Address increased consumer expectations / demands

POLITICAL / SOCIAL IMPERATIVES

Back reshoring initiatives
Maintain / increase high wage jobs
Increase exports of manufactured products
Address international competition / globalization
Increase levels of high value manufacturing overall
Support small-to-medium businesses manufacturing
Develop solutions for shrinking / variable / unsuitable labor pools

COLLABORATIVE ROBOTICS PLATFORM REVENUE



FURTHER ROBOTICS COVERAGE AREAS

CONSUMER ROBOTS | MOBILE ROBOTIC TELEPRESENCE | AUTONOMOUS VEHICLES | EMERGING TECHNOLOGIES | DRONES | COLLABORATIVE ROBOTS