Rapidly Deployable Wheelchair Power Assist Device for Healthcare Settings

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**Problem Statement**
To create a rapidly-deployable device which reduces the force required to push a wheelchair in a healthcare setting.

**Healthcare Constraints**
- Caregiver stride interference
- Multiple trips per day
- Centralized transport
- Modifications
  - IV poles
  - Oxygen tanks

**Industry Demand**
Nurses have the highest incidence of back injury in the United States and often complain of physical and mental fatigue.

**Device Requirements**
- Provide 50% power assist up to 5° incline
- Final device weight under 10 lb
- Rapidly-deployable and easily installed
- Meet applicable standards (EN/ISO)
- Operate for an entire hospital shift
- Operate intuitively with minimal training
- Retain current wheelchair functionality
- Disengage in emergency situations

**Key Features**
- Armrest Support
  - Centralized transport
  - Quick install onto chair
  - Supports weight of device
  - Compliant design allows for chair-to-chair variance

- Claw Body
  - Provides device structure
  - Encloses drivetrain, controls and power system
  - Modular architecture promotes iteration

- Claw Hub
  - Wedges move radially for centering alignment about real wheel axle

- Controls
  - Gyroscopes and accelerometers determine necessary power-assist output from motor
  - User-focused design includes status LEDs and power switch

**Installation Steps**
1. Hang device onto armrest
2. Extend wedges and move device into final position
3. Release wedges
4. Repeat for opposite side

**Results**

**Opportunity**

<table>
<thead>
<tr>
<th>Company</th>
<th>Revenue</th>
<th>Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Electric</td>
<td>$10 billion</td>
<td>Growing $1 billion+ market</td>
</tr>
<tr>
<td>Walmart</td>
<td>$485 billion</td>
<td></td>
</tr>
<tr>
<td>Amazon</td>
<td>$386 billion</td>
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<tr>
<td>Apple</td>
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</tr>
<tr>
<td>Microsoft</td>
<td>$314 billion</td>
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</tbody>
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**Impact**

**Differentiation**
- No existing product mounts onto the sides of a wheelchair
- No existing product drives the wheelchair by the spokes of the rear wheels
- No product is as easily or as rapidly deployed
- No existing product meets unique requirements of healthcare

**Value for Healthcare**
- Reducing physical stress during a nurse’s shift will lead to a better patient experience
- For the hospital:
  - Reduced
    - Employee turnover
    - Nurse time loss
    - Injury rates

**Commercialization**
- Wheelchairs in healthcare is a growing $1 billion+ market
- More than 1,000,000 potential chairs for installation
- Potential expansion markets:
  - Airports, sporting venues, amusement parks, zoos

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