


## Institution's Innovation Council

MHRD's Innovation Cell, AICTE

### Idea Submission Form

#### PART A: Idea / Proof of Concept (PoC) (Product/Service/Process)

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<div style="text-align: center;">  </div>				
<b>Name of the Idea/Proof of Concept (PoC)</b>				
<b>Theme</b>		Smart Shopping Cart		
<b>Define the problem &amp; relevance to today's market/society/industry need</b> (Max 100 words)		The problem addressed by the Smart Shopping Cart project is the inefficiency and inconvenience of traditional shopping experiences, which can cause inconvenience to customers due to long lines and crowded stores. In today's fast-paced society, where time is precious, and convenience is valued, this solution meets the increasing demand for streamlined retail experiences. By merging technology with convenience, it addresses the need for more efficient and enjoyable shopping methods, benefiting Elder people, consumers and retailers in an industry constantly seeking innovation to stay competitive.		
<b>Propose the solution to Problem Identified</b> (Max 100 words)		The solution proposed by the Smart Shopping Cart project leverages advanced technology such as RFID readers and robotic arms to automate the shopping process. By allowing customers to input their shopping list into a user-friendly interface and then autonomously navigating the store to locate and retrieve items, this solution significantly reduces the time and effort required for traditional shopping. It streamlines operations for both consumers and retailers, offering a hands-free and efficient shopping experience that		

	aligns with the modern demands for convenience and innovation in retail.
<b>Describe the product/process/ service and write how it is innovative / unique. (Max 100 words)</b>	The Smart Shopping Cart is a revolutionary retail solution that combines user-friendly interfaces, RFID technology, and robotic automation. Customers input their shopping lists, and the cart autonomously navigates the store, stopping at each tagged item to retrieve it with a robotic arm. This innovative approach eliminates the need for manual shopping, enhancing efficiency and convenience. Unlike traditional methods, it offers a hands-free experience, reducing both time and effort for shoppers while optimizing store operations. Its seamless integration of technology with the shopping experience sets a new standard for convenience and efficiency in retail, revolutionizing the way we shop.
<b>How is your proposed product/ process/service being different/ better from a similar product/ process/ service, if any, in the market (Max 100 words)</b>	Unlike traditional shopping carts or online grocery services, the Smart Shopping Cart offers a unique blend of convenience and automation. While online services require customers to browse through digital catalogs and await delivery, our solution allows shoppers to physically interact with products while still enjoying a hands-free experience. Additionally, unlike other autonomous shopping carts that may only follow predetermined paths, our cart utilizes RFID technology for precise navigation and item retrieval, ensuring accuracy and efficiency. This innovative approach provides a more engaging and seamless shopping experience, setting it apart from existing solutions in the market.
<b>If your Idea is technology based, then specify the TRL Level (Technology Readiness Level) and Expecting the features of Idea/PoC.</b>  <b>Note:</b> For the Idea level, TRL 0 – 2 is expected.  For the PoC level, TRL 3 is expected.  (Max 100 words) Chose most appropriate TRL level from Annexure 1	<p>The Smart Shopping Cart project is currently at TRL 2 (Technology Readiness Level). At this stage, the concept has been demonstrated in a laboratory environment, showcasing the feasibility of integrating RFID technology and robotic arms for automated shopping. The next steps involve prototype development and testing in a simulated retail setting to refine the technology and validate its effectiveness. Key features expected at this stage include a user-friendly interface for inputting shopping lists, RFID readers for item detection, and a robotic arm for autonomous item retrieval within a controlled environment.</p> <p>The Smart Shopping Cart project revolutionizes shopping with technology and convenience. Users input their list via a user-friendly interface. Equipped with RFID and a line follower, the cart autonomously navigates, halting at items on the list. A robotic arm retrieves and places items, enhancing efficiency and offering a hands-free experience. At TRL 3, the project demonstrates basic functionality, laying the groundwork for further development.</p>
<b>Feasibility of Idea/PoC solution (SMART)</b> (Check the appropriateness of the Idea/PoC) (Max 50 words for each from a-e)	
<b>(a) Specific-</b> Specify the features of Innovative Idea/PoC.	The Innovative Idea/PoC of the Smart Shopping Cart project features an intuitive user interface, RFID technology, and a line follower for autonomous navigation. With a robotic arm for item retrieval, it promises streamlined, hands-free shopping, enhancing both customer experience and operational efficiency.
<b>(b) Measurable-</b> Mention the approach to convert idea/PoC to Prototype/Innovation with milestones.	To advance from the Innovative Idea/PoC to Prototype/Innovation, milestones include developing a functional prototype, validating its performance through testing, and iteratively refining features based on feedback for eventual full-scale deployment in retail environments.

<p><b>(c) Attainable-</b> Explain how you are going to achieve the prototype development objective with the available resources at your disposal.</p>	<p>Prototype development for the Smart Shopping Cart project will be achieved by leveraging available resources effectively. This involves utilizing existing technology platforms, such as RFID systems and robotic arms, and collaborating with hardware and software development teams to design and build the prototype. Additionally, partnerships with retail stores for access to testing environments and feedback from potential users will ensure alignment with market needs and feasibility within resource constraints.</p>
<p><b>(d) Realistic-</b> what kind of skillset of team and resources required to achieve the goal in specific time period?</p>	<p>Achieving the Smart Shopping Cart prototype necessitates a team encompassing hardware engineers, software developers, RFID specialists, and project managers. Adequate access to development tools, testing facilities, and funding is crucial for timely completion within the specified period.</p>



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<p><b>(e) Timeline-</b> Develop a timeline against the milestones for taking Idea/PoC to Prototype Development and (or) Commercial level/start-up stage.</p>	<ol style="list-style-type: none"> <li>1. Month 1-2: Acquire hardware, develop, and test basic PoC.</li> <li>2. Month 3: Integrate RFID with vehicle system, lab testing.</li> <li>3. Month 4: Field tests with local authorities, gather data.</li> <li>4. Month 5: Optimize system based on feedback.</li> <li>5. Month 6: Validate prototype, prepare documentation.</li> <li>6. Post-Month 6: Develop business plan, seek funding, market testing.</li> </ol>
<p align="center"><b>Applicability of Solution 10 Marks</b> (Max 50 words for each from a-e)</p>	
<p><b>(a) Usability:</b> what is the usability of your innovation. (Level of acceptance of innovation and its Features among target group)</p>	<p>The RFID speed control system enhances road safety by automatically adjusting vehicle speeds in designated zones, reducing accidents. Its features include seamless RFID detection, precise speed control, and real-time feedback. The innovation is likely to be well-accepted among municipal authorities, transport companies, and drivers for its potential to improve traffic management and safety.</p>
<p><b>(b) Scalability:</b> how your innovation will be scalable at market level.</p>	<p>Our innovation's scalability lies in its adaptable design and modular components. By leveraging standardized RFID technology and open-source platforms, we can easily replicate and customize the system for various market needs. Additionally, cloud-based management allows for centralized control and updates, facilitating scalability across different regions and applications.</p>
<p><b>(c) Economic sustainability:</b> Explain the potential of innovation to become profitable or financially viable.</p>	<p>The RFID speed control system presents strong economic sustainability potential through various avenues. By reducing accidents and traffic congestion, it can save costs associated with vehicle damage, medical expenses, and time lost in traffic. Additionally, its scalability allows for widespread adoption, generating revenue through system sales, maintenance contracts, and data analytics services. Moreover, its role in enhancing road safety can attract government funding and subsidies, further bolstering its financial viability.</p>
<p><b>(d) Environment Sustainability:</b> How your innovation is environment friendly or address environmental problems.</p>	<p>Our innovation contributes to environmental sustainability by promoting smoother traffic flow and reducing vehicle emissions. By enforcing speed limits in designated zones, it minimizes unnecessary acceleration and deceleration, leading to lower fuel consumption and air pollution. Moreover, fewer accidents mean fewer vehicles idling in traffic jams, further reducing emissions and overall environmental impact.</p>
<p><b>(e) Is there any Intellectual Property (IP) Component associated with innovation? if yes, explain.</b></p>	<p>No</p>
<p>Define the potential market size (in terms of INR) and target customers. (Max 100 words)</p>	
	<p>The potential market size for the RFID speed control system in India could reach several billion INR annually. Target customers include municipal authorities responsible for road management, transportation companies seeking to enhance fleet safety and efficiency, and automotive manufacturers interested in integrating advanced safety features into vehicles.</p>

## Annexure 1

### Themes:

1. Healthcare & Biomedical devices.
2. Agriculture & Rural Development.
3. Smart Vehicles/ Electric vehicle/ Electric vehicle motor and battery technology.
4. Food Processing.
5. Robotics and Drones.
6. Waste management.
7. Clean & Potable water.
8. Renewable and affordable Energy.
9. IoT based technologies (e.g. Security & Surveillance systems etc)
10. ICT, cyber physical systems, Block chain, Cognitive computing, Cloud computing, AI & ML.

### 9 stages of TRL:

TRL 0 : Idea. Unproven concept, no testing has been performed.

TRL 1 : Basic research. Principles postulated observed but no experimental proof available. TRL 2 : Technology formulation. Concept and application have been formulated.

TRL 3 : Applied research. First laboratory tests completed; proof of concept.

TRL 4 : Small scale prototype built in a laboratory environment ("ugly" prototype). TRL

5 : Large scale prototype tested in intended environment.

TRL 6 : Prototype system tested in intended environment close to expected performance. TRL 7 :

Demonstration system operating in operational environment at pre-commercial scale. TRL 8 : First of a kind commercial system. Manufacturing issues solved.

TRL 9 : Full commercial application, technology available for consumers.