Definition of Scope - Manufacturing-Related R&D

Manufacturing innovation is fostered by research and development of technologies that are aimed at increasing the competitive capability of manufacturing concerns. Broadly speaking, manufacturing-related R&D encompasses improvements in existing methods or processes, or wholly new processes, machines or systems. Four main areas include:

1. Unit process level technologies that create or improve manufacturing processes, including:
    - fundamental improvements in existing manufacturing processes that deliver substantial productivity, quality, or environmental benefits
    - development of new manufacturing processes, including new materials, coatings, methods, and practices associated with these processes.
2. Machine level technologies that create or improve manufacturing equipment, including:
    - improvements in capital equipment that create increased capability (such as accuracy or repeatability), increased capacity (through productivity improvements or cost reduction), or increased environmental efficiency (safety, energy efficiency, environmental impact)
    - new apparatus and equipment for manufacturing, including additive and subtractive manufacturing, deformation and molding, assembly and test, semiconductor fabrication, and nanotechnology.
3. Systems level technologies for innovation in the manufacturing enterprise, including:
    - advances in controls, sensors, networks, and other information technologies that improve the quality and productivity of manufacturing cells, lines, systems, and facilities
    - innovation in extended enterprise functions critical to manufacturing, such as quality systems, resource management, supply chain integration, and distribution, scheduling and tracking
    - technologies that enable integrated and collaborative product and process development, including computer-aided and expert systems for design, tolerancing, process and materials selection, life-cycle cost estimation, rapid prototyping, and tooling.
4. Environment or societal level technologies that improve workforce abilities and manufacturing competitiveness, including:
    - technologies for improved workforce health and safety, such as human factors and ergonomics
    - technologies that aid and improve workforce manufacturing skills and technical excellence, such as educational systems incorporating improved manufacturing knowledge and instructional methods.