TECHNOLOGY ROADMAP WORKSHOP: TRANSFORMING THE FOOD FACTORY TO THE CULINARY CENTERS OF THE 21ST/22ND CENTURIES

10-11 MAY 2016 / WASHINGTON, DC

OVERVIEW

On 10-11 May 2016, a workshop was completed in Washington DC, completing one of the critical follow-ups coming out of the first workshop of the TFMII held one year ago at the University of Nebraska-Lincoln (May 18-19 2015).

The focus of this new workshop was the creation of a technology road map that would identify the few critical technology areas the TFMII will focus on in order fulfill its mission that was set in the inaugural meeting in Lincoln, NE.

The shared vision set forward in 2015 was the creation of a national public-private partnership focusing on improving the quality, volume, safety and security of food through advanced manufacturing.

Close to twenty-five companies, manufacturing partnerships, state and regional development entities and universities came together in Washington and worked for two days in several interactive breakout sessions on identifying the gaps in the current technology universe of the Food and Beverage industry and on creating a future roadmap proposal of realistic and proven technological solutions that would propel the industry to the next evolutionary level.

The workshop opened with confirmation of the outcomes and mandates from the Lincoln, NE work of 2015

The transformation of food manufacturing is a national/global imperative.

There is broad interest and support for building a public private partnership to enable and accelerate this transformation.

There will be a concomitant transformation and growth of the advanced food manufacturing workforce to one that is highly skilled and well paid.

Education and public policy around food quality and safety must be an integral part of this enterprise.

The group then reviewed the Food and Beverage Industry senior executive survey that was completed on behalf of the TFMII in the last two months by the consulting firm Oakland Innovation of UK.

The executives interviewed were from both major food manufacturing companies as well as companies that supplied equipment to those food manufacturers predominantly in North America and the subject of the survey was the identification of major technological obstacles currently present in these companies daily operations and to name a few strategic technical areas of development that they would be interested in participating through the TFMII activities.

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The workshop attendees organized in two subgroups worked on brainstorming new technological approaches, then grouped the resulting new technologies in separate subgroups and finally completed a first draft of a 3A mapping based on the available very diverse collective knowledge and experience of the group.

5 KEY THEME AREAS OF INTEREST

Sanitation/ Food Safety Strategies
Low Impact Pasteurization
Robust Real-Time Sensing & Big Data Analysis
Processes that maintain the "Farm Natural Variability" of Food
Packaging Change-Over Technologies

The resulting new technologies were grouped in five broad areas of technical innovation. A decision was also made to cross prioritize the areas of interest in the three general TFMII operation modes of Lead, Monitor or Adapt based on whether the technologies will be developed within TFMII or be adapted from other more advanced industries which have already developed the precursor technological base for the required innovation by the Food Industry.

The following six broad areas of interest were identified by the workshop group with the sub-bullets showing the recommended programs the TFMII should lead:

1 **Controls and Artificial Intelligence**
- Pilot demonstration of integrated process automation capability
- Pilot plant use for education and outreach/training

2 **New Materials and Materials Science and Engineering**
- Water Filtration Innovative material for total water reuse
- Anti-fouling robotic surfaces antimicrobial coatings for food contact surfaces
- Advance Sensors material
- Functionalized surfaces (Laser, Chemical etc.).

3 **Sensors and Real Time Sensing Systems**
- Real time Biosensors; Biohazard, Sanitation
- Real time quality sensors focused on composition, physico-chemical properties
- Process efficiency real time sensors for customized tasks
- Real time Bioavailability/activity sensors

4 **Big Data Analytics**
- Classification of data needs
- Data Integration standards and Food Infomatics
- Data integration across entire Supply Chain
- Data utilities
- Data communication, analysis, utilization and specificity

5 **Robotics**
- Sanitary Robotic Design
- Clean-In-Place Capable Robotics
- Robotic Manipulators for Food handling

6 **Labor Force Re-training and Outreach Programs**
- Community development programs aligned with new technologies
- Education outreach regarding the new technological platforms

The final 3A map rated the high potential target programs from all six categories above in the three dimensional space of Availability, Applicability and Affordability which in essence identified the top priority programs for TFMII.

The group also identified areas of technological need that the TFMII will either monitor their progress as they develop in other industries or adapt and apply as see fit. These two groups of Monitor and Adapt technologies are not going to be included in this report but they are available for distribution to any party interested to review.

The last action of the group was to identify strategies to increase the visibility and reach of the TFMII initiates in order to adjust and fine tune the chosen development programs based on real feedback from the food and beverage industry, government and regulatory agencies and academic institutions.

NEXT STEPS

☐ **Increase Visibility of TFMII:** Each participant took ownership of specific actions to help increase the visibility of the TFMII.

☐ **Clarify and Secure funding:** Clarify the funding of the TFMII on the federal, State and Private sector levels based on the outcome of the TFMII pre-proposal submitted on April 20, 2016.

☐ **Organize Approach for Engaging Industry:** Decide on the approach for engagement of the private companies currently committed to the mission of TFMII.

☐ **Validate Technology Map Top Priorities:** Share the top priority programs identified from the final 3A map with selected member companies to validate and verify commercial interest.

☐ **Start Industry Engagement:** Initiate face to face meetings with top priority companies to discuss the type of engagement preferred.