Technological Innovation Adoption - Constraint Commonalities

Summary of the 2009 EFITA/JIAC plenary session

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The Cross-Theme Session: "Constraint Commonalities of Technological Innovation Adoption" was convened during the 2009 EFITA/JIAC conference. It followed a plethora of presentations focused on ICT developments and applications (www.efita.eu). The session attempted to decipher ICT development and adoption constraint commonalities as guidelines to explain "why significant ICT potential benefits for agriculture and rural development remain unrealized". Cause and blame are often assigned to soaring ICT development and equipment costs, distorted policies, investment in "wrong priorities", squandering scarce Human Capital and inadequate end user proficiencies. Cross evaluation of constraint commonalities can go a long way to rectify this situation - at least by avoiding repetition of past mistakes. (**See below references for detailed 2009 Science Forum background think pieces and presentations).**

Session background presentations in addition focused on constraints gleaned from the 10 year EFITA ICT Adoption Questionnaire data sets; Research and Farmer insights of Precision Agriculture adoption - concepts, expectations, results and constraints over time; an overview of ICT state of the art and public sector perspectives, a panel discussion and a summary. Hopefully the main insights reviewed will be instrumental in anticipating future innovation adoption constraints and consequently formulating effective responses.

The Questionnaire data-sets since 1997 identify constraint commonalities. Contrary to expected improvements inherent in learning curves 90% of the 2009 Questionnaire replies still identify ICT Adoption as a major problem of public concern, with public funding justified for ICT services and solutions for farmers. (http://departments.agri.huji.ac.il/economics/voet-gelb.pdf).The following consistently suggest why:

- lack of ICT applications "tailored" to end-user needs;
- insufficient ICT proficiency to match application complexities;
- inadequate synchronization updating with production, market and environmental realities and dictates;

The commonalities reviewed stressed evolving realities - "farmers" and "farm-workers" today may not be rural residents; a "farm" may not be a rural location neither focused on agricultural production nor "farmland" based re bio-manufacturing, aquaculture, hydroponics, genetically engineered "test tube" products - frozen embryos; human – machine interfaces are becoming a norm;

physical inputs (information, climate control) and production decisions may be dictated remotely rather than by local agronomic best practices; a plethora of ISO and GAP dictates, health and/or environment directives must be considered - the list is long and growing. The assumption that an adoption constraint once mastered will neutralize any similar innovation constraint in the future is no longer indisputable.

The key session-highlighted constraint commonalities are categorized for convenience into four ICT development and adoption entities - Research, Extension, End users ("Farmers") and Service providers. The insights are governed by an *a-priori* assumption of a free and full four-way flow of information – in itself a major innovation. In addition recognition that since innovation complexity increases with development sophistication "in house" ICT competence of all four must match at least that of relevant agents of change and their strategic horizons.

Research Considerations:

- "Research" as "innovation producers" is often irrelevant to current farming realities and end user needs. Innovative responses to current demand may be a tactical success while essential strategic innovation potential and concerns are ignored;
- The innovation adoption is not necessarily a priority. As a result research is often not part of a team effort with end users and intermediaries. The cost is diminished adoption success. In extreme - innovations and innovative programs overstep into non decision making dimensions;
- Research priorities must ensure that innovation adoption requirements be compatible with available sectorial infrastructure (labs, broadband, input supply logistics, extension, etc) and end user proficiencies;
- Research projects which in many cases are funded with public priorities in mind should significantly focus on public benefit and potential sustainable viability.

Extension and intermediary considerations:

- There is an imperative need for preferably neutral intermediaries to alleviate adoption constraints e.g. old, irrelevant data redundancy;
- Innovative interaction methodology to include innovative incentives, adoption models based on end user choice of priorities and end user involvement are major adoption constraint-alleviation success factors. To this should be added the recently available open source software.

Farmer considerations:

- Innovations must be tailored to specific farm/regional characteristics: size, product, farmer proficiencies and solution feasibility;
- Farmer participation in the initial design stages of innovation initiation is a critical success factor.
- Farmer to farmer interaction, collaboration and competition can offset innovation adoption constraints. Within these innovators, agents of change and intermediaries are critical adoption success factors;
- "Doing the same" more efficiently (incorporating the innovation into existing practice) is often as productive as an "innovation" - conditional on farmer confidence in the innovation's consistent "performance" and back-up service reliability;
- Farmers are willing to invest in (innovative) technology conditional on a positive benefit/cost ratio and their individual proficiencies;

Service provider considerations:

- Ensure compatibilities of standardized definitions, updates including those initiated and or adopted by end users and agreed priorities;
- Man-machine-interface (MMI) remains a dominant ICT adoption impediment needing unique attention - hopefully with end user involvement;
- Balance farmer priorities with tendencies to promote Killer applications and company-specific "add-ons". A "Top Down" imposition of available innovations (as opposed to satisfaction of "Bottom Up" demand) is a long term strategic innovation adoption constraint. The importance of innovation reliability in this context cannot be overemphasized;
- Innovation features must be compatible with overall supporting infrastructure (including labs, broadband, input supply logistics, built-in trouble shooting, etc).

***Comments will be welcomed by** *<gelb@agri.huji.ac.il>, <hermann@auernhammer.de> <wagner@landw.uni-halle.de>,< simon@unibots.com>*

References:

Gelb, E, Ofer, A. 2006. ICT in Agriculture – Perspectives of Technological Innovation. http://departments.agri.huji.ac.il/economics/gelb-main.html

Science Forum 2009 Workshop: ICTs transforming agricultural science, research and technology generation – Think pieces and presentations
www.egfar.org/egfar/website/new/eventpage?contentId=2601#think-pieces