ROUTINES IN PRECISION AGRICULTURE TECHNOLOGY.

AN ACTION RESEARCH STUDY.

Martín Rubio, I.[1] Herrero Romero, J.A.[2]

[1]Dpt. Ing de Org.. Admon de Empresas y Est., ETSIDI- Universidad Politécnica de Madrid
[2]New Holland, Iberia Network Development Manager NHAg, Madrid.

E-mail: irene.mrubio@upm.es, Juanantonio.herrero@newholland.com

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1. Purpose

A crop management and precision agriculture software application facilitates the flow of information between disparate software/equipment and the network of individuals that work with them. A new generation of farmers are using precision technology to help them more efficiently manage their croplands. By measuring precisely the way their fields reflect and emit energy at visible and infrared wavelengths, precision farmers can monitor a wide range of variables that affect their crops—such as soil moisture, surface temperature, photosynthetic activity, and weed or pest infestations.

Over thirty years have passed since Nelson and Winter put the concept of routines firmly at the center of the analysis of organizational and economic change. Taken as the central unit of analysis, routines would help understand energy and agriculture economy evolution.

2. Approach: Routines, Information System & Precision Technology

Two different interpretations of the term "routines" are widespread in the literature: as behavioral regularities and as cognitive regularities. In the first case, routines are most precisely described as "recurrent interaction patterns". In the second case, routines are seen as rules, standard operating procedures, etc. Because the term has been used for referring to both cognitive and behavioral regularities, an important conclusion from the literature review is the necessity to always be precise which of the two kinds of regularities one refers to.

Organizational routines are a foundation for understanding organizational process and are defined as repetitive and recognizable patterns of action carried out by multiple actors. The theory of organizational routines emphasizes the participation of multiple actors (human and non human) and this is what distinguishes a routine as organizational rather than individual. Organizational routines are repetitive, recognizable patterns of interdependent actions, carried out by multiple actors. A central characteristic of routines is the notion of "patterns", which captures the regularity that the concept of routine stands for. Owning to this characteristic, routines constitute a form of "organizational memory" that can flow in Information System.

Information System Development (ISD), like Precision Agriculture Technologies, should be seen as more than a "technical activity" and should be understood from the "wider and organizational context in which it takes place". Extant literature has presented the ISD process as a "knowledge-intensive activity" involving "collaborative social interaction' between various actors where knowledge on requirements is "shared, absorbed and co-constructed" leading to the development of "shared mental models" by these actors through a continual process of communication. This allows us to understand the behavioral / social processes associated and how and when the process unfolds. Therefore ISD should be viewed as a "live routine".

3. Findings: Action Research at New Holland Spain

New Holland is committed to improving the environmental profile of farming, and Precision Land Management (PLM) forms a key element of this strategy. By reducing in-field passes, farmers can achieve considerable fuel savings, consequently reducing your farm's carbon footprint. But that is not all. By controlling inputs, such as fertilizers, they also cut the environmental impact of farming considerably. New Holland is a Clean Energy Leader.

Use PLM™ Connect telematics to stay connected with farmers machines, monitor vehicle performance and track equipment locations, lowering operating cost, minimizing equipment downtime and increasing fleet productivity. PLM™ desktop software offers a complete range of farm office solutions to modified field data into informed decisions that help improve yield potential, efficiencies and bottom-line profits.

We follow an action research study at New Holland Spain paying attention to the evolution of PLM strategies. We focus our attention in the routines observed in the interaction between New Holland, its distributed companies and farmers. It is important to understand how to develop PLM from this point of view.

4. Conclusions

When combine Precision Agriculture Technologies, farmers save fuel and reduce CO2 emissions. More efficient coverage of the land boosts farmer lands and their profits and gives Mother Nature a helping hand. When spraying, they prevent wasteful over spraying, saving on inputs and also preventing potentially harmful run off. When fertilizing, they reduce in-field runs and again save on inputs. Precision Agriculture Technology helps the farmer and the environment. Reducing inputs means reduced energy-intensive manufacturing and also less wastage and run off.

This case study investigates the roles of routines and the corresponding mechanism of Information System Development from the point of view of users (farmers) and its interactions with Precision Technologies distributed companies. This study, unveils the interactions among different components and actors of routines. Our findings enrich the Precision Technology literature providing a framework to integrate all interactions and components of the routines analysed.