

Studying Human Resource Information Systems Implementation using Adaptive Structuration Theory: The case of an HRIS Implementation at Dow Chemical Company

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Abstract. Research on Human Resource Information Systems (HRIS) implementation lacks theoretical depth and richness. For that reason this paper applies a theory to HRIS implementation developed by Gerardine DeSanctis and Marshal Scott Poole originally for studying information systems implementation, namely Adaptive Structuration Theory (AST). AST is based on Structuration Theory, a theory from sociology, and assumes that information systems and organizations are fundamentally interrelated. They influence each other mutually. In this paper concepts from AST are applied to a HRIS implementation at Dow Chemical Company. The case shows how a HRIS' philosophy through appropriation by end-users is being realized in HRIS outcomes.

1 Introduction

Human Resource Information Systems (HRIS) research lacks theoretical depth and richness. For that reason this paper applies a theory to HRIS implementation developed by [1], originally for studying information systems implementation, namely Adaptive Structuration Theory (AST). AST assumes that information systems and organizations are interrelated. In this paper concepts from AST are applied to study the HRIS implementation at Dow Chemicals. In this way the case of Dow shows how an HRIS' philosophy, in AST terms called spirit, is brought to life through appropriation by end-users and is shown in expected and unexpected HRIS outcomes.

In this first section, HRIS research up to date is summarized. Subsequently, Adaptive Structuration Theory will be described and some interesting results provided with the help of this theory presented. In section three the research methods applied are described, and after that in section four the HRIS implementation at Dow Chemicals will be presented.

1.1 Human Resource Information Systems Research Up to Date

In this paper we define HRISs as *all IT-based information systems and applications, either stand-alone or networked, for human resource management purposes, be it for facilitating HR practices, policies or strategies*. In earlier studies HRISs have been excluded from the e-HRM area since some authors were of the opinion that there was a fundamental difference between HRIS and e-HR in that. Basically, HRISs were directed towards the HR department itself. Users of these systems were mainly HR staff as these types of systems aimed to improve the processes within the HR department itself [2].

In this paper however, we consider the term HRIS to encapsulate the whole area of IT, internet technology and HRM. The commonly used terms nowadays like e-HRM, web-based HRM, and IT based HRM are considered as developments within the area of HRISs. Although we agree that HRISs in the early days concerned mainly IT-based information systems for the HR department, we do not agree that a line can be drawn between IT-based information systems for HR and internet-based HR applications, they are basically similar: IT technologies for HR activities, whether performed within the HR department or outside the HR department, for example by line managers and employees.

HRISs in their current appearance emerged from a number of developments in society and business. Following [3] the first building block for HRIS' was the worldwide distribution of PC's that facilitated managers and employees with the hardware to perform HR tasks electronically. However, with the availability of PCs computer literacy had to increase in order to enable managers and employees to use the technology. The Internet opened the way to connect PC's and to communicate in real-time. In this way many physical hurdles that before formed obstacles for efficient interaction and smooth business processes were bypassed. On top of that enterprise resource planning (ERP) systems created the opportunity to link all business processes. Databases that before were isolated could be integrated and "into a seamless whole for real-time transaction processing and decision making" [3; p. 367]. The final stage arrived when HR professionals and information technology specialists joined forces and developed electronic information systems "that moved HR information and decision making from file drawers to computers" [3; p. 367]. HR processes were reengineered to eliminate steps and to speed up cycle times.

Broadly speaking, HRISs appear in three types: operational HRIS's, relational HRISs, and transformational HRISs. This division is based upon [2]. The first type, operational HRISs, concern systems that are used for basic HR activities in the administrative area, such as payroll and personnel data administration (employee's personal data, job description, CV, holiday leave etc.). The second type, relational HRISs concerns more advanced HRM activities, those that involve interaction between a professional source, a HRIS application and employees and/or management. Examples of relational HRISs are recruitment and selection systems, training and development systems and performance management systems. The system contains the professional instruments, such as a professional questionnaire assessing an employee's development level, and employees and management have the online access to use them wherever, whenever. Transformational HRISs, the third type, are

the ones for HR activities with a strategic character like organisational change processes, strategic re-orientation, strategic competence management. Examples of HRIS applications of this type are corporate online discussion platforms, weblogs or applications that guide employees through the objectives, stages and methods of an organisational change process, or applications for assessment of professional skills and offering online advice for skill development aligned with strategic HR objectives. So far, large companies have tried to implement HRISs of all the three types whereas smaller and mid-size companies implemented mostly the operational and relational HRISs.

1.2 HRIS Research Up to Date

Research on HRISs started to take off in the second half of the 1980's, but it developed slowly and it for sure did not mature. Research articles from those 'early days' are from [4]; [5]; [6]; [7], [8]. The research topic received renewed attention with the growing importance of Internet technology. Since the second half of the 1990's organizations started to apply this technology for Human Resource Management purposes. 'Early birds' on the role of Internet-based applications for HRM in particular were [9] and [10]. However, these papers mainly aimed at outlining the importance of the issue, and limitedly empirical. Overall, [11] found 18 appropriate studies that can be labelled as empirical HRIS (he prefers to use the term e-HRM) studies, nine from the pre-Internet era, nine from the Internet-era. Only a few new empirical articles have appeared since Strohmeier's last study mentioned [2] was published. [12] studied the impact of e-HR on professional competence in HRM and found through interviews with HR professionals from 19 firms that "[HRIS] is a driving force in the transformation of the HR function" (p. 306). Their data suggest that this transformation is reshaping the competencies that define HR professionals' success (p. 306). [13] concludes that different types of middle managers, she distinguishes four, respond differently to HRISs. [14] and [15] conclude that especially the content and the structure of a web-based HRIS application has a positive influence on perceived HRM effectiveness.

Overall, we are of the opinion that HRIS research is in its infancy, though trying to mature if we look at conference initiatives and upcoming special journal issues and books on HRIS/e-HR. Existing research foci still need to be broadened and to be deepened in order to let HRIS research mature. This conclusion becomes even more evident if we look at the theoretical development of the HRIS research area.

[16] note, together with [17] [2] were the first to provide a theoretical framework for HRIS adoption. Strohmeier (2006) ignores even Shrivastava & Shaw's framework and only recognizes two studies that employ frameworks in order to systematise examined consequences: [18], and [2]. A very recent attempt to theorize and model HRIS drivers, intervening factors, and consequences comes from [19]. However, yet next to a limited empirical basis we observe that the HRIS field is also under-theorized, an opinion shared by [20] and [16]. For that reason, in this paper we apply a powerful theory developed by DeSanctis & Poole, Adaptive Structuration Theory.

2 Adaptive Structuration Theory (AST): A Brief Introduction

[1] and [21] ; [22], were inspired by the basic ideas of Structuration theory and developed an extended theory, initially to study groups using group decision support systems (GDSSs). In more recent publications the focus has been broadened towards advanced information technologies in general [1]. With AST, DeSanctis and Poole tried to develop a theory that holds the 'middle ground', inspired by the work of Anthony Giddens they want to position themselves between technological determinism (or objectivism) and voluntarism (or subjectivism). Initially, AST was developed for studying groups which were using an electronic group decision support system. "It looks into the process of human usage of computer systems and at the nature of group-computer interaction", was the argument advanced by [22, p. 150]. [22] were of the opinion that the concept of information technology should be reconsidered, and that structuration theory would assist them to achieve this and to formulate their adaptive structuration theory. [22] state: "Building on the theories of structuration advanced by several European social theorists, the theory of adaptive structuration attempts to explain how technology affects group and organizational processes and resultant outcomes" [22 ; p.149). Their AST holds that it is the active use of technology by people that determines the observable outcomes, rather than the view that technology is a direct, causal, influence on human behavior. This is the approach we adopt in this study. Therefore, we begin with a closer look at the basics of AST.

2.1 The Basics of Adaptive Structuration Theory

As has already been noted, AST initially in particular focused on group processes for the purpose of studying the *use* of group decision support systems. The reason for labeling it as 'adaptive' is that adaptation to the situation is seen as the primary goal of group action. This approach can accept differences in outcomes that occur even when the same conditions exist, since AST accepts that groups are not merely information processing entities but that they have a social existence that has to be considered when using group technologies [23]. [1] developed a model that presents AST in its full context, as presented in Figure 2.1. The eight arrows in the model reflect seven hypotheses:

1. Advanced information technologies (AIT) provide structures (in terms of structuration theory) which can be described in terms of their spirit and features. Different sets of spirits and features lead to different forms of interaction with the technology.
2. Use of AIT structures can vary depending on other contingencies that offer alternative sources of structures.
- 3 & 4. New sources of structure emerge as the technology and other sources of structure are applied during the course of interaction.
5. New structures emerge in group interactions as the spirit and features of an AIT are appropriated in a given context and then reproduced in group interactions over time.
6. Group decision processes will vary depending on the nature of AIT appropriation.
7. The nature of AIT appropriation will vary depending on the group internal system.

8. Given AIT and other sources of structure (n1, n2, n3, etc.) ideal appropriation processes, and decision processes that fit the task at hand, then the desired outcomes of AIT use will result.

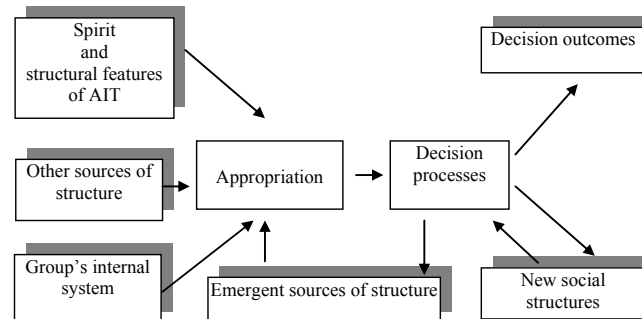


Fig. 1. The original adaptive structuration theory model [1].

Figure 1, and the seven hypotheses represent the original AST model. They are based upon two main ideas: firstly that advanced information technologies are social in nature. This is expressed by the concept of *spirit*. Secondly that advanced information technologies are being ‘realized’ by its use. This is expressed by the concept of *appropriation*.

Since AST was initially developed to study group decision support systems in use, the model and the hypotheses contain ‘decision processes’, ‘decision outcomes’, and ‘group’s internal system’. Good examples of applying AST in studying electronic group system use do exist and include [24], [25], [23], [26], and [27].

However, [1] stress that AST is also useful for studying other advanced information technologies. We are especially interested in applying it to HRIS implementations. Furthermore, AST can be considered as a general framework from which more specific hypotheses can be drawn. In this paper it is especially the concepts of spirit and appropriation, that we believe are promising and these have not been used before in studies on HRISs.

Applying AST to office technology gives our study an interesting challenge. In the following sub sections we elaborate on the spirit and the appropriation of office technology.

2.2 Spirit of Technology

One of the central elements of AST is the belief that advanced information technology is social in nature. Hence, the introduction of the concept of spirit. [1] define spirit as follows: “Spirit is the general intent with regard to values and goals underlying a given set of structural features” (p. 126). The concept of spirit concerns the ‘official line’ which the technology presents to people regarding how to act when using the system, how to interpret its features, and how to fill in gaps in procedure which are not explicitly specified (p.126). The spirit of a technology provides what Giddens calls ‘legitimation’ to the technology by supplying a normative frame with regard to behaviors that are appropriate in the context of the technology” [1 ; p.126).

The spirit can also give ‘signification’ to users, as it helps them to understand and interpret the meaning of the IT. Finally, the spirit can be a means of ‘domination’, because it presents the type of influential moves to be used with the IT. Some users may be privileged by this and others constrained. Therefore, in terms of structuration theory, the concept of spirit concerns the total set of possible structures promoted that may be called upon by means of the structural features (later on in this section we will discuss how to define the structural features). The concept of spirit suits very well what [28] calls the ‘interpretive flexibility’ of information technology. The implication of this assumption is that the realization of any object may differ between situations, and that the object itself can change as people change their mode of using it.

In terms of AST, structural features are the specific rules and resources, or capabilities, offered by the system. This suggests that an office technology must contain ‘visible’ structures but we do not agree with this point of view. In AST, the concepts of spirit and structural features are not clearly separated. Structural features only refer to the technical capabilities of a system. Structures never have a physical form, structures can only become ‘visible’ *in* human action. Information technology, in our perception, may consist of dozens of technical capabilities, but it is the technology’s spirit that enables users to make sense out of these capabilities. Therefore we prefer to speak of *technical features*, rather than structural features.

In the context of information technology, it can be said that, when users work with a specific information technology means, they make a selection from the potential of structures ‘offered’ by the spirit, by means of the technical features. This implies that a technology’s spirit can enable users to appropriate, but it also can constrain them.

In conclusion, we define the concept of the spirit of information technology as the general intent with regard to values and goals underlying a given set of technical features. This differs a little from the definition of [1], because in our view their distinction between the non-technical part and the technical part of technology is not sufficiently clear. A technology’s spirit is the ‘official line’ regarding how to act when using a technology. HRISs (and thus its spirit) can only be realized in actual use, which is referred to as appropriation. If, in a certain context, users do not appropriate an HRIS in accordance with its spirit, this may lead to unanticipated outcomes. In this way, it can be theoretically understood why similar office technologies, even in similar contexts, can lead to different outcomes. Related ways of referring to a technology’s spirit in this paper will be through the use of terms such as ‘underlying philosophy’ or ‘intention’ of an information technology.

After having explained the concept of spirit, the following section elaborates further on the concept of appropriation.

2.3 Office Technology Appropriation

AST considers information technology use as a matter of appropriation. In the relatively short history of AST, its developers have gone through some changes in the way they conceptualize appropriation. Initially, AST distinguished three dimensions of appropriation: *faithfulness of appropriation*, *attitudes towards appropriation*, and *the level of consensus on the appropriation*. However, after rethinking the theory of

adaptive structuration, [1] distinguish four dimensions of appropriation: *appropriation moves*, *faithfulness of appropriation*, *attitudes towards appropriation*, and *instrumental uses*. So, they added *appropriation moves* and *instrumental uses*, and removed *consensus on appropriation*. We believe that a combination of [1] and [24] provides the most useful concept of appropriation. We therefore include all the dimensions in our concept of appropriation.

So far, in our elaboration, we have adopted from AST the two central concepts; the spirit of an HRIS and appropriation. These concepts will be our main ‘sources’ in developing a research model that suits our study on HRISs.

2.4 HRIS Outcomes

It is assumed that an HRIS is not implemented in organizations without reason. We suppose, if an HRIS is appropriated in accordance with its spirit, that the expected effects will arise. In general, the main reason for the implementation of an HRIS is to increase business performance (productivity, efficiency, quality of services).

We assume, based upon Beer et al.’s ideas about the expected results or outcomes of HRM, that HRISs also aim to achieve a certain set of outcomes. As stated earlier, implementing an HRIS in our view, is a way of carrying out HRM, it is a way of thinking about and implementing HRM strategies, policies, and practices. By following a specific HRIS direction, an organization expects to achieve certain goals: an improvement in the HR’s strategic orientation, an improvement in client focus and satisfaction, and a decrease in costs or increased efficiency.

Besides these goals that can lead to anticipated outcomes, a number of so-called ‘overall’ organizational goals can be distinguished regarding an organization’s ‘social capital’. All HRM activities, and therefore also all e-HRM activities, will implicitly or explicitly be directed towards these ‘overall’ goals. [29] distinguish four possibilities: high commitment, high competence, cost effectiveness, and higher congruence. By high commitment they mean that the workforce is motivated and understanding, and that they are willing to interact with the management about changes in the organizational environment and the impact that this can have on the internal organization. For HR itself, this means that it should be able to play the role of change agent, to use [30] terminology. High commitment implies a high level of trust between management and workforce. High competence points towards the capacities of employees to learn new tasks and roles if the circumstances require it. For HR itself it means, in Ulrich’s framework, playing the employee champion role. Cost effectiveness refers to the competitiveness of pay levels and employee turnover rate, and to the acceptability of costs resulting from employee resistance such as strikes. As [30] states, HR itself has to be able to play the administrative expert role in order to contribute to an organization’s cost effectiveness. Finally, higher congruence refers to the internal organization, the reward system, and the ‘input, throughput, and output’ of personnel, which need to be structured in the interests of all stakeholders.

2.5 Towards a Research Model

In this section we will combine the above-described ‘ingredients’ in a research model, which will then guide our study on HRIS implementation:

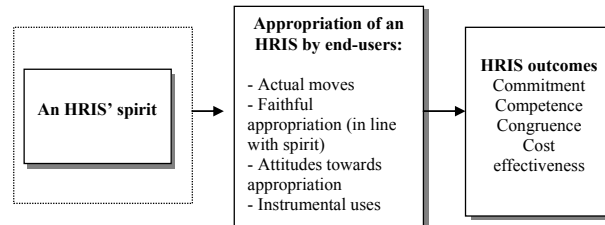


Fig. 2. The research model.

3 Research Method

In this paper we apply a case study approach. Within the case study approach, specific techniques have to be selected for collecting the data. One of the components of the method is that the data collected must be suitable for answering the research questions and for testing the hypotheses. As noted earlier, our research is basically of a soft-line deterministic nature, as our research model, is based on AST.

We have several techniques at our disposal, such as conversational interviews, non-conversational interviews or written questionnaires, participant observation, and document analysis. For our study we have chosen conversational and non-conversational interviews (written questionnaires) as the dominant techniques. The conversational interviews particularly are used to describe the variables in the research model, the non-conversational interviews are used for testing the hypotheses which represent the relationships between the variables in the research model.

Conversational interviews are adequate for the following reasons. Firstly, we studied an HRIS implementation retrospectively. Because of time constraints it was not possible to participate in a HRIS projects from start to end. Secondly, through the use of conversational interviews with representatives of all groups of participants, it was possible to reconstruct an HRIS implementation from start to end. In this sense, the conversational interviews are used as an instrument for *ethnographical* purposes. ‘Traditional’ ethnographical methods concern participant observation within a specific context, often for a considerable a period of time; the researcher is in fact the research instrument. Because of the practical constraints it was not possible to participate in a number of office technology projects over a period of time. Therefore we had to choose an alternative; we used project participants who had been able to observe the project as ‘researchers’ and let them tell their story. As this includes representatives of all the project parties, we have a so-called multi-view of the project, and are able to describe the variables as discerned in our research model. The non-

conversational interviews, which we will refer to as questionnaires from now on, were used to test our hypotheses.

Besides the two types of interviews as the dominant techniques, and the analysis of documents as additional techniques, we also used immediate participant observations as a source of data. As explained, it was not possible to be constantly present in the projects, but in all of them we observed a number of users of the newly implemented HRIS over a short period of time. The data collected in this way is in addition to the data obtained from the dominant techniques. How we developed the instruments for use in the case studies is described below.

Table 1. Concepts, definitions and indicators.

concept	definition	Indicators
Spirit of HRIS	The extent to which the general intent regarding the values and goals underlying an HRISs set of technical features is clear to users.	<ul style="list-style-type: none"> - the technology's goals - the 'thought behind' an HRIS - knowing where effective use of an HRIS leads to - knowing what developers aimed for - knowing how an HRIS is used optimally
Technical features	The visible, technical capabilities users are offered being a part of an HRIS.	<ul style="list-style-type: none"> - Level of restrictiveness - Level of sophistication - Degree of comprehensiveness
Appropriation	The physical and mental activities that users of HRIS carry out while making a selection from the potential set of structures of an HRIS, represented by the spirit and the technical features, for the day-to-day practices.	<ul style="list-style-type: none"> - Actual use (moves) - Use in line with the spirit (faithful appropriation) - Usefulness of an HRIS - Ease of use of an HRIS - Instrumental use of an HRIS - Consensus about use
HRIS outcomes	The extent to which the day-to-day activities of the group of users of an HRIS have to be carried out to meet the standards required.	<ul style="list-style-type: none"> - Commitment - Congruence - Cost effectiveness - Competence

4 Results: An HRIS Implementation at Dow Chemicals

The Dow Chemical Company is one of the largest chemical companies in the world. This US-based company (Midland, Michigan) is now active in 33 countries around the globe. Dow was until recently a country-oriented company, with fairly autonomous sites around the world only loosely coupled with Dow sites in other countries. During the mid-1990s this changed, and Dow aimed to become a global company in which the globally dispersed sites would be turned more into business-oriented units. Dow's current organizational structure is flat (a maximum of six layers) and based upon worldwide-organized businesses. This provides employees with a high level of independence and accountability, and employees work in self-managing teams, process operators as well as managers.

4.1 The Research Site: Dow Benelux B.V.

Dow Benelux is part of the global Dow Company, and has ten production locations and three office locations. Dow's largest production site outside of the United States is located in Terneuzen (the Netherlands). This site consists of 41 units, of which 26 are factories. Dow's European accounting unit and its Research and Development unit are also located in Terneuzen. The total number of employees at Dow Benelux is about 2800, with about 600 in Belgium and 2200 in the Netherlands (with 2100 in Terneuzen). The average period that the employees have been working at Dow Benelux is 16 years, and their average age is 42.

Dow Benelux produces more than 800 different products, most of which are semi-manufactured goods for application in all kinds of products used in aspects of our daily lives. Examples of markets where Dow is a major 'player' are: furniture and furnishings (carpets, furniture materials), maintenance of buildings (paint, coatings, cleaning materials, isolation), personal care (soap, creams, lotions, packing materials), and health and medicine (gloves for surgeons, diapers, sport articles).

4.2 Starting With e-HRM at Dow: The Spirit of the People Success System

In 1997, Dow started to introduce the People Success System (PSS): "a system of Human Resource reference materials and tools that help provide the underpinnings of Dow's new culture". Before the introduction of PSS (which is technically based upon Peoplesoft), Dow already had a number of electronic HR systems in use. PSS's difference was that it was based upon the idea of having one database, and more importantly, with PSS, a completely new HR philosophy was introduced.

With the PSS, Dow's management aimed to provide an integrated Human Resources system that supported Dow's strategy and enabled the culture that is necessary for individual and business success to flourish. Further, Dow's management aimed to support a global business organization, empower employees, support a de-layered organization and self-directed teams, and create a change-ready workforce.

The spirit of the PSS. The People Success System is a result of Dow's strategic, global, competence-based HR policy. It is a system of 'Human Resource reference materials and tools that help provide the underpinnings of Dow's new culture'. The electronic tool is seen as a necessary enabler. The PSS consists of four components, visualized as four pieces of a puzzle: one in the center, and the other three around it. The middle piece, the heart of the 'People Success puzzle', is Performance Expectations and seen as the central component of the entire system. It describes the required contributions from both the employees and the company for success. The other pieces are compensation, development, and opportunities.

Dow plans and decides on how many, and what kinds of, talents are needed for the future through its Corporate Staffing strategy, Strategic HR Planning, and Workforce of the Future. It is claimed that Dow attracts new employees through providing them

with challenging and interesting work, extensive resources for personnel development, empowerment, competitive pay and global scope.

Appropriation of the HRIS at Dow Chemicals Company. This part describes the way people at Dow appropriate the People Success System, that is how people incorporate the PSS' spirit through using the web-based tools and resources available into their day-to-day work

The first reaction to the People Success System from people working in the plants was one of hesitance (*appropriation moves*), and the supporting staff were also hesitant but in a more open way. The difference can be attributed to three aspects. Firstly, the differences in PC experience: the people working in the plants were generally less used to working with a PC, especially the elderly workers. Secondly, there was a lack of available PCs in the plants. Thirdly, the dominant language in the People Success System was English, and the plant workers were, on average, less skilled in English.

Overall, people at Dow appreciated the fact that, with the PSS, information became available that was not previously accessible (*consensus about use*). The global compensation system especially received a lot of hits at the beginning, because it provided information about salaries at all job levels at all Dow sites around the world (*appropriation moves/faithful use/usefulness*). People could compare between countries and between job levels. This contributed to the open culture that had been announced as part of the HR changes at Dow.

Interestingly, due to the introduction of a whole new HR philosophy, there was so much information available that it discouraged people from exploring the system (*appropriation moves/usefulness*). It could create a feeling of getting lost, not knowing how to find the way.

Initially, employees had a lot of questions about the system (*ease of use*), but after some time these tailed off. Coaches organized meetings to explain the system to employees, especially for those in the plants. Employees were stimulated to use the system, and to investigate the system. The impression is given that the problems people experienced with the implementation of the system were not exceptional in comparison to other changes. The large resistance to using the PSS (*appropriation moves*) was similar to resistance experienced during other change processes.

As the system became more sophisticated, the enthusiasm for using the system itself increased (*appropriation moves/usefulness*). Quite soon after the implementation, in 1997, Dow's Job Announcement System (JAS) became available. Until then, the people at Dow had been reluctant to believe that this system would really create the transparent and flexible internal labor market promised. At Dow, the traditional way of filling vacancies was to contact friendly colleagues or line managers within the company. Some people expected to be blocked by their managers if they wanted to apply for a job elsewhere in the company. However, the JAS has been the greatest success story with the PSS, initially and still today (*appropriation moves/faithfulness of appropriation/usefulness*). Line managers have to publish job vacancies on the JAS, and employees, right from the very start, have used the opportunities offered to apply internally for jobs. Some line managers were not pleased by the fact that their employees 'walked out', and complained to HR "Help, my people are walking out".

HR's reply in such cases was "Then you have a problem" meaning that the line managers had to work on the way they managed their people.

Six Months Later. It can be said that various groups appropriated the People Success System differently (faithfulness of appropriation). Supporting staff were 'getting along' with the PSS more easily than plant employees (easiness of use). The impression exists that many people still do not go deeply into the system (faithfulness of appropriation/usefulness/easiness of use). A lack of time is one of the explanations that people give. Others think that this is just an excuse for not accepting responsibility for one's own development (faithfulness of appropriation). The People Success System stresses learning and development, which is a difference to Dow's 'old' situation. One half a day every two months can be an appropriate amount of time for using the system.

In 2001 most of the material on the PSS was translated into Dutch, so language should no longer be a motive for not using the tools and resources. However, the view exists that this did not lead to a change in attitude towards using the PSS (*appropriation moves*).

Generally, departments seem to have two or three employees who are interested in searching using the internet. In particular, young people were the more enthusiastic users (*appropriation moves/usefulness*). Elderly workers in the beginning did not want to work with the system because of their lack of PC skills and because most of the information was in English. However, much information has now been translated, as remarked upon earlier. Tools such as feedback and learning tools are used by some employees, but others find these tools to vague and difficult (especially operators). A significant group of employees did not use the 360 degrees feedback tool (*appropriation moves*) because they were afraid that a negative outcome would be used by their managers as evidence of a negative performance. This is despite Dow's management having announced that the result of the 360 degrees feedback tool is confidential: the employee decides what, if anything, to do with the result (*consensus about use*).

Although everybody has received all the information about the system, it could be that there are too many screens and steps to go through. It could be that operators, in particular, need more precise interfaces (*easiness of use*).

One interesting aspect is that the opinion exists that the PSS stresses very much the social issues (training, conflict management, language, and social skills) rather than the professional technical skills. As one person close to this topic said: "*We simply rely on their (new employees) education; presuming that they have their technical and professional skills. In my view, many mistakes were made in the recruiting of new employees because of the issues in the system: too much attention is given to the social aspects and not to the normal professional skills*".

In conclusion, it can be said that the organization's members, in the first stage of appropriation, worked with the PSS mainly as an operational e-HR tool. They used it a source of information (*faithfulness of appropriation*). When more tools and resources were added in 1997 and 1998, especially when the JAS was added, appropriation switched, to some extent, towards relational e-HR, albeit with caution (*faithfulness of appropriation*). Since then, we have concluded that the PSS appropriation has slightly moved towards transformational e-HR, given that young

new employees use the competency assessment tool for new employees right from their start at Dow (*faithfulness of appropriation*). They use the development tool to compile their development plan for the near future, are happy to be immediately exposed to the JAS, and are used to learn@dow. In this way the workforce has become more change ready (*faithfulness of appropriation*).

4.3 HRIS Outcomes

Commitment. The new system has not in itself changed the commitment of employees at Dow. If commitment has improved, and this is difficult to prove, then it is not because of the system.

At the same time we have found an indirect connection: the transparency of the company has increased and its policies have become more open - the same information is available to the management and to the employees. The most impressive example is the openness of the compensation part of the PSS. Salaries of all positions are visible to everybody, anyone can see how much the leaders earn, and in all countries.

There is no direct and linear relationship between the commitment and trust – whether the relationship was strengthened due to the PSS is uncertain. However, our respondents were certain that the system had not destroyed it.

Competence. Overall, it can be said that the competencies of people at Dow have increased: 60-70% of the employees have developed their competencies by using the PSS. There are amusing anecdotes in the company about some employees who had to start to learn how to operate a PC because of the PSS implementation. Some older employees now proudly tell their grandchildren that they have learned to work with a PC...

With the new Strategic Blueprint and the new HR philosophy (competence-based) there can be more people than before on a senior level within a group of workers. There can now be more than one ‘first operator’ working on a shift, and an increase in the number of team members who can do specific tasks, and this makes job rotation possible.

Since the implementation of the PSS, employees can see how to change and develop, and this is very new to them. According to some views, the idea of career self-management is not yet fully working: employees need more time and this has to be granted by their team leader. Within Dow, a more revealing opinion can be heard about the opportunities the PSS gives. There is a commonly held view that there are many examples of individuals who have wanted to develop themselves at Dow, and who have been successful due to the PSS. With about 2000 operators, it cannot be expected that all of them will develop careers at Dow. Further, time and the availability of the privacy needed to work on a PC are always limited. However, those who are motivated will find a solution, and the system has given people the opportunity to develop their basic educational level (the level they entered Dow with). This is desirable because the plant has become more complex, and more highly

educated people are necessary. However, there are still people who do not accept this responsibility.

The Job Announcement System (JAS) has contributed greatly to personal development. Being a user-friendly and well-designed tool, it provides the opportunity to plan a career within Dow. Some of the respondents found the JAS the best part of the PSS.

People learnt the English terminology used in the PSS very quickly, and did not need to wait until the information was translated. Also people's PC skills improved. Furthermore, the extent of communication with non-Dutch managers, 'outsiders', has increased.

The learning component was also experienced as very new. Now, if you want to learn, you can. An impression gained is that the general opinion is that the e-learning tool is used in a different manner than it was intended. This could be due to the American style of the courses that sometimes seem to teach obvious things. The e-learning tool in itself is a good idea, but the content is not always relevant to a person's position and needs.

Congruence. Communication is now very fast and it is very simple to communicate with anybody. In the plant, however, there are still employees who never check their e-mail. However, one hears that direct contacts have been dramatically reduced.

Overall, in the plants there are still voices that say that there is too much information that employees have to go through, there are too less PCs, there is little time to work with the PSS, and some employees have difficulties with English (although at least the materials have now been translated).

The philosophy of the PSS, however, is sound and important: it empowers the company, but it is valid to ask whether you need an intranet/electronic tool to achieve this. Most of the information was already available before the PSS was introduced, and to find that the new system contains already familiar information can be disappointing.

HR specialists say that people are now more aware of what the company wants from them. People are trying to do something about their knowledge and skills. All the information needed about how to develop is on-line, so there is no need to physically go to the HR department.

Now that the performance evaluation criteria and processes are clear, and information about this can be found on the web, leaders cannot do whatever they want because the employees are better informed.

Cost effectiveness. In terms of cost effectiveness, it is difficult to determine whether the PSS has helped in reducing costs. However, one interesting detail is that, ten years ago, Dow employees used less paper than they do now. So, probably the PSS did not help to reduce paper usage.

The e-learning component Learn@dow has saved money. It reduced costs in terms of space, time and human resources. The number of courses that can be offered through the HR intranet is also far more than the number that could be offered class room-based.

Further, there remain people at Dow who believe that 30-50% of employees will never access the People Success System. They would not know what it is, where to

find information, and why they should access it. Potentially it is still difficult for half the employees to use the system in accordance with its initial idea, for example, to search out and manage their own personal development.

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