The Implementation of integrated Management Information Systems in the Human Resource Management: An empirical Study of Success Factors

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Summary

Research Question:	What are the determining success factors of IT implementation processes in HR environments?
Methods:	Quantitative examination of a self-developed survey by the application of frequency analyses, factor analyses, reliability analyses, correlation analyses, and linear regression analyses.
Results:	Confirmation of the Technology Acceptance Model (TAM). The identification of several distinctive success factors within the functionalities of HR IT systems and change management processes.
Structure of the Article:	1. Introduction; 2. Literature Review; 3. Research Model & Methods; 4. Empirical Results; 5. Conclusions; 6. About the Author; 7. References.

1. Introduction

Being primarily responsible for administrative tasks in the past, the traditional role of Human Resource Management (HRM) has changed over time and HR departments are increasingly being developed to service centers for organization´s personnel to predict and cope with future challenges. Particularly globalization, demographic change, and the change in social values represent major organizational challenges. Free trade zones and the easy access to markets via World Wide Web cause rising competition by low-cost competitors from overseas. While domestic markets leave hardly options for expansion, the foreign markets are expected to grow further. Empowering employees to interact with unfamiliar cultures could provide companies with competitive advantages. Furthermore, regionally different demographic developments cause a shift of labor demand, growing shortage of qualified employees, and increasing wages (Friedman, 2007). Especially for the German society, demographic change will represent the most drastic reason for future challenges. The shrinking population will intensify dramatically after 2015, losing up to 600,000 inhabitants per year at its peak and will not slow down until 2040. (Statistisches Bundesamt, 2009, 2011, 2013). Additionally, the newly emerging "Generation Y" employees will increasingly enter the labor market. They are technically able, highly educated, and confident, but have a lack in direction. "Generation Y" employees favor a democratic style of management, seek those who will promote their professional development and want intellectual challenge. The demographic change will force them to cope with fast promotions and early leadership responsibilities (Eisner, 2004). Merely providing customers with products and services is getting insufficient for business success of today's organizations. Accordingly, HRM is more and more perceived as one of the key sources for a sustainable competitive advantage. Maintaining employee-related data and generating appropriate reports for the management´s decision-making are getting crucial aspects for any organization. These IT systems improved tremendously over time, because of the fast technological development. While the acquirement of information was an essential factor in the past, the accurate concentration of the information flood is getting essential today. Furthermore, the technological development leads to a reduction of the time HR professionals have to spend on routine transactional activities and HR departments are enabled to become a strategic partner in organizations. Regarding this, appropriate measures have to be developed for aligning HR successfully with the corporate strategy of the organization. This causes the need for successful change management processes, whereby the natural human behavior, to react with resistance when confronted with organizational change, has to be counteracted appropriately (Thite, Kavanagh, & Johnson, 2011).

2. Literature Review

Change Management

Managerial practices and problems do not last throughout the lifetime of a company, but are rooted in time and number of its employees. This causes parenthetical challenges and reasons for change. Accordingly, Greiner (1972) developed a model, which presents particular challenges depending on developmental phases through which organizations pass as they grow. Each phase begins in a period of "Evolution" with steady growth and stability and ends with a period of "Revolution", whereby a crisis determines whether or not a company will move

forward into the next phase. Crises are caused by problems of coordination and communication, when new functions and levels in the management hierarchy emerge. Work becomes more interrelated and new solutions have to be developed at each phase. Those companies that survive a crisis usually enjoy several years of continuous growth without a major economic setback or severe internal disruption. Managers have to be aware when the time for change has come and should be cautious not to skip phases out of impatience. Each phase produces certain strengths and learning experiences in the organization that will be essential for success in subsequent phases.

The fundamental problem of change management is the preparation of organizations now for predicted challenges in the future. But it is a natural human behavior to react with resistance, when confronted with organizational change. This unconscious defense mechanism should be expected and are results from feelings of anxiety and a perceived disturbance of the status quo (Bovey & Hede, 2001). People fear the unknown, that they lose control, or will not be able to develop the newly required skills. When implementing significant change, leaders need to be aware of these defense mechanisms to develop, promote, and implement appropriate strategies to cope with them. Thereby, some people tend to move through the change process rather quickly, while others may become stuck or experience multiple difficulties (Kotter & Schlesinger, 2008).

Regarding to the implementation of a successful change process, Kotter (1995) distinguishes between eight steps. At first, it is crucial to establish a sense of urgency that change is needed (1). Then, a powerful guiding coalition has to be formed to lead the change efforts (2). The next step is creating a vision and strategies to direct the change effort (3). Then, every possible vehicle has to be used for communicating the new vision (4). Furthermore, it is important to get rid of obstacles and empower others to act on the vision (5). The next step is represented by rewarding of adjusted behavior and creating short-term wins (6). Afterwards, improvements have to be consolidated and still more change has to be produced (7). Finally, the new approaches must be institutionalized by connecting the new behavior with corporate success (8).

HR Controlling

The main functions for any organization´s management are the operational planning of its internal business activities and the strategic alignment with its external business environment. But as organizations grow with their success, their increasing complexity prevents managers to oversee all business processes themselves. This leads to a stronger division of labor and a higher degree of delegation. Therefore, improved management systems are needed for the decision making processes of the organization´s management. To this regard, the basic function of controlling is the adjustment and harmonization of the organization´s supply of data and information with its systems for planning and control. It provides the management with relevant information by consulting and tailored reports. To avoid the information overload and dumping of useless numbers, this information is evaluated, aggregated, and allocated by "Management Information Systems (MIS)". They comply in form and content with the needs of the particular management level, and thus enable managers to make efficient business decisions (Gladen, 2014).

HR controlling has similar objectives as the corporate controlling, but is based on HR activities. In contrast, its special characteristic is the poorly measurable data and hardly attributable contribution to the organization´s success (Lindner-Lohmann, Lohmann, & Schirmer, 2012). William Hewlett, the co-founder of Hewlett-Packard, once stated the very popular phrase *"You cannot manage what you cannot measure"* (House & Price, 1991, p.93). It is obviously right that for everything what can be measured, its measurement is mandatory to manage it efficiently. But on the other hand, W. Edwards Deming, the father of quality management, replied: *"Actually, the most important figures that one needs for management are unknown or unknowable […], but successful management must nevertheless take account of them."* (Deming, 1986, p.121) Thus, you cannot run a business successfully on visible figures alone. You also have to manage what you cannot measure, or at least what is very difficult to measure. MIS concerning the HRM are also determined as "Human Resource Information Systems (HRIS)" (Ngai & Wat, 2006).

HR professionals have to be aware that intangibles represent the hidden value of any organization. One of their most common weaknesses is their fear of quantitative or measurable results, which may be caused by a lack of knowledge about the empirical assessments of their contributions to the organization´s success. HR measurement is complex and difficult, but it can and must be done. As other business functions use financial data as evidence, HR professionals should also be able to link their added value to business results by operationalizing their deliverables (Ulrich & Smallwood, 2005; Ulrich, 1997).

Kaplan & Norton (1992) considerably enhanced usual measurement systems with their Balanced Scorecard (BSC). Accordingly, organizations are able to convert resources, including intangible assets like HR, into desired tangible outcomes (Kaplan & Norton, 1992, 1996). While intangible assets in the BSC are represented by the "Learning and Growth" perspective, Becker, Huselid, & Ulrich (2001) advanced this model to the "HR Scorecard". Thus, HR measurement systems should be based on a clear understanding of the corporate strategy and the required capabilities and behaviors of the workforce to implement it. As a management tool for describing and measuring how people create value, the "HR Scorecard" is a key to strengthen the strategic influence of HRM in organizations. It is also divided into four perspectives. Thereby, the "Workforce Success" as the ultimate objective of any HR system determines if the workforce as in-

ternal customers has accomplished the key strategic objectives for the business success. The "HR Workforce Competencies" determine, if HR professionals have the skills they need to design and implement successful HRM. The "HR Systems" have to be integrated and aligned with the business strategy, or differentiated where appropriate. The "HR Practices" determine if HR policies and practices are designed and implemented throughout the organization. Depending on the organization's business objectives, these perspectives also help to determine KPI´s that represent HR value. Subsequently, the BSC has been further adjusted and linked with the "HR Scorecard" (Beatty, Huselid, & Schneider, 2003; Becker et al., 2001; Lockwood, 2006).

Acceptance of Information Technology

Despite the fact that the implementation of advanced Information Technology (IT) systems generates significant performance gains for organizations, however many employees are often unwilling to use them if available. Accordingly, designers are seeking methods for evaluating the acceptance of IT systems as early as possible in the design and implementation process. So, many models exist for the acceptance of implementation processes related to IT (Venkatesh, Morris, Davis, & Davis, 2003). A very popular and strongly validated approach is represented by the "Technology Acceptance Model (TAM)" (Davis, Bagozzi, & Warshaw, 1989; Davis, 1989). The TAM was developed to predict individual adoption and usage of new IT. It is based on the assumption that the individuals´ "Actual Usage Behavior" is causally linked to their "Intention to Use" an IT system. This in turn is determined by the two key factors "Perceived Usefulness" and "Perceived Ease of Use". Thereby, the "Perceived Usefulness" is defined as the degree to which a person believes that using a particular system will enhance his or her job performance. In contrast, "Perceived Ease of Use" refers to the degree to which a person believes that using a particular IT system will be free of effort. The TAM further assumes that these two factors are mediated by the effect of external variables (Davis et al., 1989; Davis, 1989). There has been substantial empirical support in favor of the TAM and it proved to be well-suited for modeling IT acceptance. Later on, it has been extended several times. Thereby, TAM 2 includes the effect of several external factors for "Perceived Usefulness" (Venkatesh & Davis, 2000). TAM 3 includes the effect of several external factors for both "Perceived Usefulness" and "Perceived Ease of Use" (Venkatesh & Bala, 2008; Venkatesh, 2000). However, the major findings yield three insights concerning the determinants of managerial IT usage:

- People's actual usage behavior can be predicted reasonably well from their intentions.
- Perceived usefulness is a major determinant of people's intentions to use IT.
- Perceived ease of use is a significant secondary determinant of people's intentions to use IT.

3. Research Model & Methods

Hypotheses and Research Model

The research question asks for the determining success factors of IT implementation processes within HR environments. This could be determined by the later actual usage of the system. But in an implementation process, you are not able to measure the actual usage behavior yet. Regardless, to provide organizations with appropriate strategies and measures for successful implementation processes, it is necessary to identify promoters and success factors before the actual implementation process has started. Therefore, this examination will be based on the assumption that "Actual Usage Behavior" can be predicted reasonably well from the people´s "Intention to Use" an IT system. Accordingly, I will derive the success factors for my examination from the TAM (Davis et al., 1989; Davis, 1989). Thus, "Perceived Usefulness" is a major determinant and "Perceived Ease of Use" is a significant secondary determinant of people's "Intentions to Use" an IT system. These in turn are determined by external variables. For this examination, I will focus on success factors to determine the "Perceived Usefulness" in the implementation process of an integrated HRIS. The first success factor is determined by the employees´ "Experience (EX)" and "IT Skills (SK)". The second success factor is determined by the "Previous Usage (PU)" of other IT systems. Referring to the eight steps of Kotter (1995), "Change Management (CM)" will represent the third success factor. The fourth success factor is determined by the "Functionality of the IT System", which will be divided into variables for "Employee Functions (EF)" and "Manager Functions (MF)".

To link the identified success factors with the "Intention to Use", I will retest the relations of the TAM and formulate the following hypotheses:

H1: *The "Perceived Usefulness" has a positive effect on the "Intention to Use".*

H2: *The "Perceived Ease of Use" has a positive effect on the "Intention to Use".*

For testing the effects of each identified success factor on the "Perceived Usefulness", I formulate the following hypotheses:

- *Experience (EX) and IT Skills (SK)*

  H3a: *High work experience has a positive effect on the "Perceived Usefulness".*

  H3b: *High seniority has a positive effect on the "Perceived Usefulness".*

  H3c: *The terms of employment have a positive effect on the "Perceived Usefulness".*

H3d: *The personal skills of IT software have a positive effect on the "Perceived Usefulness".*

H3e: *The previous experience with similar IT software has a positive effect on the "Perceived Usefulness".*

- *Previous Usage of IT Systems (PU)*
  H4a: *Frequent PC usage has a positive effect on the "Perceived Usefulness".*

  H4b: *Having access to SAP has a positive effect on the "Perceived Usefulness".*

  H4c: *Frequent usage of SAP has a positive effect on the "Perceived Usefulness".*

  H4d: *Having access to SAP HCM has a positive effect on the "Perceived Usefulness".*

  H4e: *Frequent Usage of SAP HCM has a positive effect on the "Perceived Usefulness".*

- *Change Management (CM)*
  H5a: *The perceived urgency of the implementation has a positive effect on the "Perceived Usefulness".*

  H5b: *The vision of the outcome has a positive effect on the "Perceived Usefulness".*

  H5c: *Perceived short-wins have a positive effect on the "Perceived Usefulness".*

  H5d: *High information about the project´s status has a positive effect on the "Perceived Usefulness".*

  H5e: *High information about the project´s objectives has a positive effect on the "Perceived Usefulness".*

  H5f: *Perceived support by the management has a positive effect on "Perceived Usefulness".*

- *Employee Functions (EF) and Manager Functions (MF)*
  H6a: *The functions for employees have positive effects on "Perceived Usefulness".*

  H6b: *The functions for managers have positive effects on the "Perceived Usefulness".*

These hypotheses lead to the following research model for the acceptance of HRIS implementation processes, which illustrates the relations between the success factors and the "Perceived Usefulness (U)". It further shows the relations of "Perceived Usefulness (U)" and "Perceived Ease of Use (EU)" on the "Intention to Use (IU)". This in turn builds the link to the anticipated "Actual Usage Behavior" (see Figure 1).

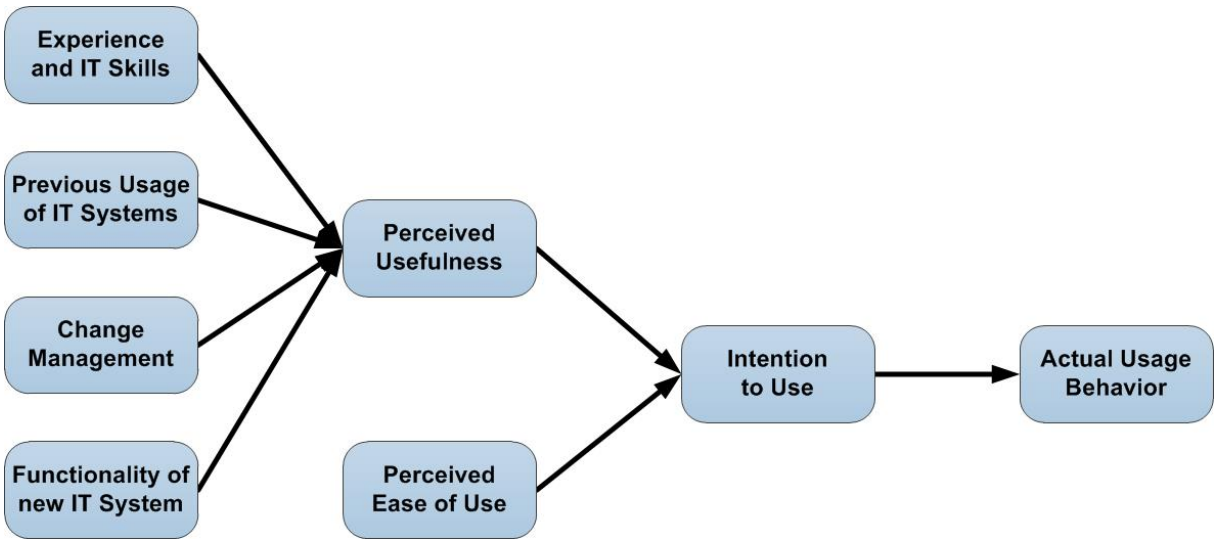

Figure 1: *Research Model for the Acceptance of HRIS Implementation Processes*
Own illustration according to Davis et al. (1989); Davis (1989)

Used statistical Methods

The common goal of quantitative research methods is the generation of realistic conclusions. Thus, their basic quality criteria are the "Objectivity" of the quantitative research method as well as the "Reliability" and "Validity" of the measured data. Accordingly, "Computer Assisted Personal Interviewing (CAPI)" avoids many ascertainment errors and represents a highly objective research method (Häder, 2010). The presented hypotheses have been operationalized by applying a self-developed CAPI survey and deducting several items. Hereby, the statistical methods of metric scales are applicable, because most items have been evaluated by using five-level Likert scales. Accordingly, I conducted frequency analyses and used measures of central tendency for describing the re-

sults. Furthermore, I conducted factor analyses for reasonable variables to merge them into identified factors. Thereby, I tested the appropriateness by using the "Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO)" and the "Bartlett's Test of Sphericity (BTS)" (Dziuban & Shirkey, 1974). Furthermore, the reliability of merged variables and other identified factors have been tested by using the Cronbach-Alpha (Cortina, 1993; Cronbach, 1951; Schmitt, 1996).

The relationships between variables have been analyzed by conducting correlation analyses and using the Pearson's correlation coefficient (*r*). But this provides no explanations how the variables causally depend on each other, or considers effects like spurious or hidden correlations. Subsequently, regression analyses have to be conducted for examining the linear relationship of correlating variables (Auer & Rottmann, 2010). For the applicability of the linear regression model, additional basic assumptions have to be tested. Otherwise, the result of the regression analysis could be inefficient or misleading. One assumption is the normality of the error distribution. It can be tested graphically by using the histogram and the normal p-p plot of regression. Furthermore, the linearity has to be tested, which is determined by the "Coefficient of Determination (R^2)". Another assumption to be tested is the independence of errors or absence of autocorrelation, which is tested by measuring the "Durbin-Watson-Coefficient (DWC)". A further assumption to be tested is the absence of multicollinearity in the predictors, which is tested by measuring the "Variance Inflation Factor (VIF)". Furthermore, the constant variance of errors or absence of heteroscedasticity has to be tested. This can be tested graphically by using the scatterplot, which forms a "funnel" in case of heteroscedasticity (Auer & Rottmann, 2010; Duller, 2013).

4. Empirical Results

Object of Investigation & Control Variables

The CAPI survey has been distributed in a large globally acting logistics company via its internal network platform, which provides access for all employees with a PC-based working place and ensures anonymity. The employees of the corporate HR department have been invited to participate voluntarily in the survey. Thus, 46 employees executed the questionnaire. Thereby, the first control variable "Gender (G)" is determined by 14 male (30.4%) and 32 female (69.6%) participants. The second control variable "Age (A)" shows that the majority of the participants were between 25 and 35 years old (52.2%). The third control variable is the participants´ "Education (E)". Thereby, 22 participants (47.8 %) got the "*allgemeine Hochschulreife (Abitur)*" and 9 participants (19.6 %) got the "*Fachhochschulreife*". These represent the highest achievable school graduations in Germany and allow the visit of a university. 15 participants (32.6 %) got a "*Hauptschulabschluss*" or "*Realschulabschluss* (*Mittlere Reife*)". These are comparable to the American "*Junior High School*" or "*Middle School*". For evaluating the last control variable "Vocational and Academic Training (T)", the participants have been asked for their completed qualifications. Thereby, 23 participants (50 %) got a "*Berufsausbildung (Lehre)*", which is the usual German vocational qualification. 3 participants (6.5 %) visited a "*Fach-, Meister-, Technikerschule, Berufs- oder Fachakademie*", which are advanced vocational qualifications. 4 participants (8.7%) got a "*Bachelor*" degree and 15 (32.6%) got "*(Fach-) Hochschulabschluss (e.g. Diploma/ Master)*", which are university degrees. No one has a "*Promotion*", which is comparable to the American "*Ph.D.*" and represents the highest academic qualification.

Perceived Usefulness and Perceived Ease of Use

In this first step, I determine "Intention to Use (IU)" as the dependent variable (y). Then, I will examine "Perceived Usefulness (U)" and "Perceived Ease of Use (EU)" as independent variables (x), which according to my research model have a direct influence on the "Intention to Use (IU)" an IT system.

A reliability analysis for the three items of "Intention to Use (IU)" generated a Cronbach-Alpha of .843. By neglecting item IU3, Cronbach-Alpha is increased to .975. Thus, the "Intention to Use (IU)" will be operationalized by using the formula *IU = Mean (IU2; IU2).*

A reliability analysis for the four items of "Perceived Usefulness (U)" generated a Cronbach-Alpha of .878. By neglecting item U1, Cronbach-Alpha is increased to .882. Thus, the "Perceived Usefulness (U)" will be operationalized by using the formula *U = Mean (U2; U3; U4).*

A reliability analysis for the four items of "Perceived Ease of Use (EU)" generated a Cronbach-Alpha of .824. By neglecting item EU1, Cronbach-Alpha is increased to .908. Thus, the "Perceived Ease of Use (EU)" will be operationalized by using the formula *EU = Mean (EU2; EU3; EU4).*

Table 1
Correlation Matrix of Factors for Intention to Use and Control Variables

	IU	U	EU	A	G	E	T
IU							
U	.851**						
EU	.468**	.416**					
A	.095$^{n.s.}$	.020$^{n.s.}$	.101$^{n.s.}$				
G	.194$^{n.s.}$	.067$^{n.s.}$	.245$^{n.s.}$	.115$^{n.s.}$			
E	.040$^{n.s.}$	.041$^{n.s.}$	.194$^{n.s.}$	.162$^{n.s.}$	.270^{+}		
T	.251^{+}	.161$^{n.s.}$	.040$^{n.s.}$	.111$^{n.s.}$	.169$^{n.s.}$	.521**	

Notes: IU = Intention to Use; U = Perceived Usefulness; EU = Ease of Use; A = Age; G = Gender; E = Education; T = Vocational and Academic Training; ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$.

The correlation analysis of factors for Intention to Use (IU) and the corresponding control variables (see Table 1) determines a highly significant correlation of "Intention to Use (IU)" with "Perceived Usefulness (U)" (r = .851; $p < .01$) and "Perceived Ease of Use (EU)" (r = .468; $p < .01$). Thus, a later regression analysis is applicable to prove their dependencies. Additionally, a correlation analysis with the control variables has been conducted. Thereby, a slight correlation between "Intention to Use (IU)" and "Vocational and Academic Training (T)" (r = .251; $p < .1$) has been measured which accordingly comes into consideration as control variable for the subsequent regression analysis (see Table 2). All other control variables did not reveal any significant results ($p > .1$) and will be neglected.

Table 2
Regression Analysis of Factors for Intention to Use

y	x	R^2	B	SE	β	DWC	VIF
IU		.758				2.064	
	U		.841	.094	.765**		1.257
	EU		.292	.158	.156^{+}		1.226
	T		.089	.052	.134^{+}		1.042
	(Constant)		-.772	.689			

Notes: y = Dependent Variable, x = Independent Variable, R^2 = Coefficient of Determination, B = Regression Coefficient, SE = Standard Error, β = Standardized Regression Coefficient, DWC = Durbin-Watson-Coefficient, VIF = Variance Inflation Factor, ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$.

The "Coefficient of Determination (R^2)" determines that 75.8% of the total variation in "Intention to Use (IU)" can be explained by the linear relationship with the factors "Perceived Usefulness (U)" (β = .765), "Perceived Ease of Use (EU)" (β = .156), and "Vocational and Academic Training (T)" (β = .134). Thereby, the "Standardized Regression Coefficient (β)" for "Perceived Usefulness (U)" shows a strong and highly significant contribution ($p < .01$). "Perceived Ease of Use (EU)" and "Vocational and Academic Training (T)" at least show a slight tendency ($p < .1$). The testing of the linear relationship shows that the normality of the error distribution can be assumed. The high "Coefficient of Determination (R^2)" shows a distinctive linearity of the regression model. The excellent "Durbin-Watson-Coefficient" (DWC = 2.064) confirms the absence of autocorrelation. Furthermore, the low "Variance Inflation Factor" (VIF = 1.257 for U; 1.226 for EU; 1.042 for T) of the variables approves the absence of multicollinearity in the predictors. Due to the scatterplot, heteroscedasticity cannot totally be excluded.

Experience and IT Skills

The item for "Work Experience (EX1)" shows that most participants have 5-10 years of total work experience (28.3 %). The item for "Seniority (EX2)" reveals that most of the participants have a seniority of less than three years (50%). The "Terms of Employment (EX3)" show that 35 participants work full-time (77.8%) and 10 participants work part-time (22.2%) with N = 1 not specified. The "Previous Experience (EX4)" shows that 18 participants (39.1%) do not have any experience with

SAP implementations. For those, who have experience, it is mostly positive (41.3%). The items for "IT Skills" of Microsoft Office (SK1), company-specific ERP systems (SK2), PERSIS/ iPERSIS (SK3), and SAP (SK4) reveal that the participants have their highest "IT Skills" in Microsoft Office (SK1) with M = 4.07 (SD = .712). The "IT Skills" of SAP (SK4) show a mediocre result with M = 2.91 (SD = 1.411). All other IT Skills are rather low.

A correlation analysis of these variables with "Perceived Usefulness (U)" (see Table 3) shows a highly significant and positive correlation for "IT Skills of SAP (SK4)" (r = .492; p < .01). Thus, it will be included in the later regression analysis. With regards to the content, the negative correlations of "Seniority (EX2)" (r = -.286; p < .1) and "IT Skills of company-specific ERP systems (SK2)" (r = -.463; p < .01) are not reasonable and will be neglected. All other variables do not show any significant correlations (p > .1) and will be neglected, too.

Table 3
Correlation Matrix of Experience and IT Skills with Perceived Usefulness

	U	EX1	EX2	EX3	EX4	SK1	SK2	SK3	SK4
U									
EX1	-.048$^{n.s.}$								
EX2	-.286^{+}	.333*							
EX3	.235$^{n.s.}$	-.203$^{n.s.}$	-.285^{+}						
EX4	-.045$^{n.s.}$	.189$^{n.s.}$	.338^{+}	-.024$^{n.s.}$					
SK1	.021$^{n.s.}$	-.304*	-.313*	.200$^{n.s.}$	-.093$^{n.s.}$				
SK2	-.463**	-.161$^{n.s.}$	-.101$^{n.s.}$	.164$^{n.s.}$	.147$^{n.s.}$	.124$^{n.s.}$			
SK3	-.061$^{n.s.}$	-.163$^{n.s.}$	.077$^{n.s.}$	.171$^{n.s.}$	.330^{+}	.294*	.174$^{n.s.}$		
SK4	.492**	.391**	.127$^{n.s.}$	.220$^{n.s.}$	.504**	.050$^{n.s.}$	-.324*	.058$^{n.s.}$	

Notes: U = Perceived Usefulness; EX = Experience with IT; SK = IT Skills; ** p < 0.01; * p < 0.05; $^{+}$ p < 0.1; $^{n.s.}$ p > 0.1.

Previous Usage of IT Systems

31 participants (75.6%) have "Access to SAP (PU2)" with N = 5 not specified. 28 participants (71.8%) have "Access to SAP HCM (PU4)" with N = 7 not specified. The "Average Usage of the PC (PU1)" shows that most participants (72.7%) use a PC for more than 30 hours per week. The "Average Usage of SAP (PU3)" and the "Average Usage of SAP HCM (PU5)" tends to the result that the participants either use them more than 30 or less than 5 hours per week.

A correlation analysis of the variables with "Perceived Usefulness (U)" (see Table 4) shows a highly significant correlation for "Access to SAP (PU2)" (r = .458; p < .01) and a significant correlation for the "Access to SAP HCM (PU4)" (r = .403; p < .05). Furthermore, it shows a positive tendency for the "Average Usage of SAP (PU3)" (r = .276; p < .1) and the "Average Usage of SAP HCM (PU5)" (r = .273; p < .1). Because of the highly significant correlation between PU2 and PU4 (r = .937; p < .01) and with regard to their content, only the more significant variable PU2 will be included in the later regression analysis. All other variables will be neglected.

Table 4
Correlation Matrix of previous IT Usage with Perceived Usefulness

	U	PU1	PU2	PU3	PU4	PU5
U						
PU1	.247$^{n.s.}$					
PU2	.458**	.342*				
PU3	.276^{+}	.147$^{n.s.}$	.523**			
PU4	.403*	.297^{+}	.937**	.605**		
PU5	.273^{+}	.151$^{n.s.}$	.557**	.996**	.595**	

Notes: U = Perceived Usefulness; PU = Previous Usage of IT Systems; ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$.

Change Management

39 participants (84.8%) declared that they knew of the planned implementation of additional SAP HCM applications before this survey. The results show that the factor "Urgency" is perceived as the most important one with M = 4.17 (SD = 1.018) for CM1 and M = 4.05 (SD = 1.022) for CM3. The results for "Vision (CM2)" (M = 3.79; SD = 1.081), "Short-Wins (CM4)" (M = 3.60; SD = 1.014) and "Information of the Objectives (CM6)" (M = 3.46; SD = 1.295) are medial. The factors "Information of the Status (CM5)" (M = 3.08; SD = 1.222) and "Support of the Management (CM7)" (M = 3.17; SD = 1.014) are perceived as less important.

A correlation analysis of these variables with "Perceived Usefulness (U)" (see Table 5) shows a highly significant correlation for the variables "Urgency (CM1)" (r = .603; $p < .01$), "Vision (CM2)" (r = .550; $p < .01$), and "Short-Wins (CM4)" (r = .526; $p < .01$). "Information of the Status (CM5)" (r = .368; $p < .05$) and "Information of the Objectives (CM6)" (r = .329; $p < .05$) show at least a significant and positive correlation. "Urgency, negated (CM3)" and "Support of the Management (CM7)" do not reveal any significant correlation ($p > .1$). Thus, CM1, CM2, and CM4 will be included as single-item factors in the later regression analysis. All other variables will be neglected.

Table 5
Correlation Matrix of Change Management with Perceived Usefulness

	U	CM1	CM2	CM3	CM4	CM5	CM6	CM7
U								
CM1	.603**							
CM2	.550**	.786**						
CM3	.074$^{n.s.}$	.406**	.343*					
CM4	.526**	.431**	.459**	.099$^{n.s.}$				
CM5	.368*	.424**	.396*	-.140$^{n.s.}$	.320^{+}			
CM6	.329*	.428**	.485**	-.052$^{n.s.}$	.123$^{n.s.}$	.842**		
CM7	-.071$^{n.s.}$	-.076$^{n.s.}$	-.030$^{n.s.}$	-.284$^{n.s.}$	.220$^{n.s.}$	.361*	.200$^{n.s.}$	

Notes: U = Perceived Usefulness; CM = Change Management; ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$.

Functionality of the IT System

The following "Employee Functions (EF)" have been tested:

- EF1: An always updated overview of the hierarchical and functional relationships within the company.
- EF2: An always updated overview of company vacancies with job descriptions and required qualifications.
- EF3: The digital input and update of own personal data.
- EF4: The digital documentation and archiving of own personnel documents.
- EF5: An always updated overview of the own working time and attendance.
- EF 6: The digital service and archiving of payrolls.
- EF7: An always updated overview of the own vacation file.

- EF8: The digital application for and approval of vacations.
- EF9: The digital application for and approval of business travels and travel expense accounting.
- EF10: An always updated overview and planning of the personal career development.
- EF11: The digital planning and application for further education and training.
- EF12: An automatic reminder function for personal due dates.
- EF13: The digital management of workflows (e.g. joint underwritings).

A factor analysis has been conducted for these items to determine interrelated variables. Thereby, four variables have been identified for the employee´s functions that explain 69.57% of the total variance with a significant BTS and an acceptable KMO of .67.

A reliability analysis for the items EF3, EF5, EF7, and EF12 of the first component generated a Cronbach-Alpha of .757. By neglecting item EF3, Cronbach-Alpha is increased to .761, which is also reasonable referring to the content. Thus, the items EF5, EF7, and EF12 will be merged to the factor "Personal Time Management (PTM)" and operationalized by using the formula *PTM = Mean (EF5; EF7; EF12) = 4.34 (SD = .627).*

A reliability analysis for the items EF2, EF10, EF11, and EF13 of the second component generated a Cronbach-Alpha of .717. By neglecting item EF2, Cronbach-Alpha could be increased to .733. But with regard to the content, it is more reasonable to keep it. Thus, these items will be merged to the factor "Personal Career Management (PCM)" and operationalized by using the formula *PCM = Mean (EF2; EF10; EF11; EF13) = 4.05 (SD = .571).*

A reliability analysis for the items EF4 and EF6 of the third component generated a Cronbach-Alpha of .575. But item EF3, which has already been neglected for component one, matches component three nearly as good as component one. It also matches contently and increases the Cronbach-Alpha to .671. Thus, these items will be merged to the factor "Personal Document Management (PDM)" and operationalized by using the formula *PDM = Mean (EF3; EF4; EF6) = 3.67 (SD = .803).*

A reliability analysis for the items EF1, EF8, and EF9 of the fourth component directly generated a maximum Cronbach-Alpha of .734. Thus, these items will be merged to the factor "Personal Authorization Management (PAM)" and operationalized by using the formula *PAM = Mean (EF1; EF8; EF9) = 4.24 (SD = .660).*

The following "Manager Functions (MF)" have been tested:

- MF1: Digital support for appraisal interviews.
- MF2: Digital support for goal-settings.
- MF3: Digital support for writing appraisals and job references.
- MF4: Digital support for the preparation of employment contracts.
- MF5: Digital support for succession planning and management.
- MF6: Digital support for the identification and management of talents.
- MF7: Digital support of current HR KPI´s, statistics and reports.
- MF8: The access to the IT system with mobile devices.
- MF9: Digital support of personnel deployment planning.
- MF10: Digital support of personnel cost planning.
- MF11: Digital support of compensation management.
- MF12: Digital management of own department.
- MF13: Digital management of own project teams.

A factor analysis has been conducted for these items to determine interrelated variables. Thereby, three variables have been identified for the manager´s functions that explain 77.1% of the total variance with a significant BTS and a good KMO of .79.

A reliability analysis for the items MF1, MF2, MF3, MF5, and MF6 of the first component directly generated a maximum Cronbach-Alpha of .903. Thus, these items will be merged to the factor "HR Operations Management (HROM)" and operationalized by using the formula *HROM = Mean (MF1; MF2; MF3; MF5; MF6) = 3.99 (SD = .671).*

A reliability analysis for the items MF7, MF12, and MF13 of the second component directly generated a maximum Cronbach-Alpha of .853. Thus, these items will be merged to the factor "HR Information Management (HRIM)" and operationalized by using the formula *HRIM = Mean (MF7; MF12; MF13) = 4.10 (SD = .755).*

A reliability analysis for the items MF4, MF8, MF9, MF10, and MF11 of the third component generated a Cronbach-Alpha of .867. By neglecting item MF8, Cronbach-Alpha is increased to .872, which is also reasonable referring to the content. Thus, the items MF4, MF9, MF10, and MF11 will be merged to the factor "HR Planning and Compensation (HRPC)" and operationalized by using the formula *HRPC = Mean (MF4; MF9; MF10; MF11) = 4.17 (SD = .680).*

Table 6
Correlation Matrix of Functions with Perceived Usefulness

	U	PTM	PCM	PDM	PAM	HROM	HRIM	HRPC
U								
PTM	.151$^{n.s.}$							
PCM	.487**	.399**						
PDM	.302*	.456**	.329*					
PAM	.452**	.265^{+}	.492**	.423**				
HROM	.564**	.233$^{n.s.}$	.449**	.297*	.239$^{n.s.}$			
HRIM	.463**	.325*	.291^{+}	.361*	.170$^{n.s.}$	.677**		
HRPC	.522**	.364*	.293^{+}	.246$^{n.s.}$	.210$^{n.s.}$	.735**	.773**	

Notes: U = Perceived Usefulness; PTM = Personal Time Management; PCM = Personal Career Management; PDM = Personal Document Management; PAM = Personal Authorization Management; HROM = HR Operations Management; HRIM = HR Information Management; HRPC = HR Planning and Compensation; ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$.

The corresponding correlation analysis with "Perceived Usefulness (U)" (see Table 6) shows a highly significant and positive correlation for the variables "Personal Career Management (PCM)" ($r = .487$; $p < .01$), "Personal Authorization Management (PAM)" ($r = .452$; $p < .01$), "HR Operations Management (HROM)" ($r = .564$; $p < .01$), "HR Information Management (HRIM)" ($r = .463$; $p < .01$), and "HR Planning and Compensation (HRPC)" ($r = .522$; $p < .01$). Furthermore, the "Personal Document Management (PDM)" shows at least a significant and positive correlation ($r = .302$; $p < .05$). "Personal Time Management (PTM)" does not show any significant correlation ($p > .1$). Thus, the variables PCM, PAM, HROM, HRIM, and HRPC will be included as factors in the later regression analysis. All other variables will be neglected.

Factors for determining Perceived Usefulness

The subsequent regression analysis of "Perceived Usefulness (U)" as dependent variable (y) with all previously identified factors (SK4; PU2; CM1; CM2; CM4; PCM; PAM; HROM; HRIM; HRPC) as dependent variables (x) did not reveal any significant contribution at all. But a revised regression analysis, which automatically excludes dispensable factors, revealed the following results (see Table 7):

Table 7
Revised Regression Analysis of Factors for Perceived Usefulness

y	x	R^2	B	SE	β	DWC	VIF
U		.524				2.270	
	CM1		.297	.102	.372**		1.130
	PCM		.334	.171	.262^{+}		1.253
	HRPC		.395	.148	.350*		1.194
	(Constant)		-.066	.752			

Notes: y = Dependent Variable, x = Independent Variable, R^2 = Coefficient of Determination, B = Regression Coefficient, SE = Standard Error, β = Standardized Regression Coefficient, DWC = Durbin-Watson-Coefficient, VIF = Variance Inflation Factor, ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$.

Thus, the "Coefficient of Determination (R^2)" shows that at least 52.4% of the total variation in "Perceived Usefulness (U)" can be explained by the linear relationship with the factors "Urgency (CM1)" (β = .372), "Personal Career Management (PCM)" (β = .262), and "HR Planning and Compensation (HRPC)" (β = .350). Thereby, the "Standardized Regression Coefficient (β)" for "Urgency (CM1)" shows a highly significant contribution ($p < .01$), "HR Planning and Compensation (HRPC)" shows a significant contribution ($p < .05$), and "Personal Career Management (PCM)" shows a slight tendency ($p < .1$). The testing of the linear relationship shows that the normality of the error distribution can be assumed. The mediocre "Coefficient of Determination (R^2)" shows a slight linearity of the regression model. The sufficient "Durbin-Watson-Coefficient (DWC)" of 2.270 indicates absence

of autocorrelation. Furthermore, the low "Variance Inflation Factor" (VIF = 1.130 for CM1; 1.253 for PCM; 1.194 for HRPC) of the variables approves the absence of multicollinearity in the predictors. Due to the scatterplot, heteroscedasticity cannot totally be excluded.

Findings

The analyses of "Perceived Usefulness (U)" and "Perceived Ease of Use (EU)" as factors to determine the "Intention to Use (IU)" an IT system strongly confirm the TAM of Davis et al. (1989). Thereby, "Vocational and Academic Training (T)" has been identified as considerable control variable (see Table 2). Accordingly, the employees´ qualifications tend to have an effect on their intention to use the IT system. The overall results further indicate that there are no general relations between work experience and the later usage of IT systems. This offers the opportunity that employees probably face implementation processes without considerable prejudices. Also the individual IT skills of unrelated software seem to have no significant effects. But IT skills of related software, like SAP for the implementation of SAP applications, could have remarkable effects. This should be observed as a success factor for further examinations. Even the access to SAP and its usage seem to have considerable effects on the "Perceived Usefulness (U)". Differences between the usage of SAP and SAP HCM could not be examined distinctively, because in this sample almost every user with access to SAP has access to SAP HCM, too. Further examinations should observe other samples with different usage behavior.

The results further indicate that the urgency of change processes is perceived as very important by the participants with a remarkable effect on the "Perceived Usefulness (U)" of HR IT systems. Also the creation of a clear vision and fast short-wins seem to be highly important for the implementation processes. Furthermore, the communication about the status and objectives of the process is still positively related to the "Perceived Usefulness (U)" of HR IT systems. The support of the management seems to be less important. But this could be explained by the fact that in this case the participants are still in an early stage of the change process. Further examinations should additionally observe samples in later stages. Another major finding of this examination is the identification of several success factors within the functionalities of HR IT systems for employees and managers. Further examinations should focus on confirming and distinguishing these success factors more specifically. So far, the results indicate that functions relating to the "Personal Time Management (PTM)" are mostly important for employees (M = 4.34). Functions, which are related to "HR Planning and Compensation (HRPC)", are mostly important for managers (M = 4.17). These findings should be considered deliberately, whether particular functions should be implemented at all or which functions should be implemented first to create short-wins.

Table 8
Summary of the Findings

Hypothesis	Dependent Variable (y)	Independent Variable (x)	Correlation	Regression	Result
H1	IU	U	**	**	Confirmed
H2	IU	EU	**	+	Confirmed
H3a	U	EX1	n.s.	n.a.	Not confirmed
H3b	U	EX2	n.s.	n.a.	Not confirmed
H3c	U	EX3	n.s.	n.a.	Not confirmed
H3d	U	SK1	n.s.	n.a.	Not confirmed
H3d	U	SK2	n.s.	n.a.	Not confirmed
H3d	U	SK3	n.s.	n.a.	Not confirmed
H3d	U	SK4	**	n.s.	Partly confirmed
H3e	U	EX4	n.s.	n.a.	Not confirmed
H4a	U	PU1	n.s.	n.a.	Not confirmed
H4b	U	PU2	**	n.s.	Partly confirmed
H4c	U	PU3	+	n.s.	Not confirmed
H4d	U	PU4	*	n.s.	Partly confirmed
H4e	U	PU5	+	n.s.	Not confirmed
H5a	U	CM1	**	**	Confirmed
H5a	U	CM3	n.s.	n.a.	Not confirmed
H5b	U	CM2	**	n.s.	Partly confirmed
H5c	U	CM4	**	n.s.	Partly confirmed
H5d	U	CM5	*	n.s.	Partly confirmed
H5e	U	CM6	*	n.s.	Partly confirmed
H5f	U	CM7	n.s.	n.a.	Not confirmed
H6a	U	PTM	n.s.	n.a.	Not confirmed
H6a	U	PCM	**	+	Confirmed
H6a	U	PDM	*	n.s.	Partly confirmed
H6a	U	PAM	**	n.s.	Partly confirmed
H6b	U	HROM	**	n.s.	Partly confirmed
H6b	U	HRIM	**	n.s.	Partly confirmed
H6b	U	HRPC	**	*	Confirmed

Notes: IU = Intention to Use; U = Perceived Usefulness; EU = Ease of Use; EX = Experience with IT; SK = IT Skills; PU = Previous Usage of IT Systems; CM = Change Management; PTM = Personal Time Management; PCM = Personal Career Management; PDM = Personal Document Management; PAM = Personal Authorization Management; HROM = HR Operations Management; HRIM = HR Information Management; HRPC = HR Planning and Compensation; ** $p < 0.01$; * $p < 0.05$; $^{+}$ $p < 0.1$; $^{n.s.}$ $p > 0.1$; $^{n.a.}$ = not applicable.

The previous table (Table 8) presents a summary of the hypotheses testing. Accordingly, effects on the dependent variables have not been confirmed, when no significant (n.s.) and positive correlation was identified. In such case, the regression analysis was not applicable (n.a.). In case of a significant and positive correlation, the variables have been further examined by the regression analysis. When this did not show a significant result, the corresponding hypothesis has only been confirmed partly. In case of significance, the corresponding hypothesis has been confirmed and the variable has been identified as decisive success factor for the acceptance of HRIS implementation processes. Accordingly, the perceived "Urgency" ($\beta = .372$; $p < .01$) of the change as well as the functions "HR Planning and Compensation" for managers ($\beta = .350$; $p < .05$) and "Personal Career Management" for employees ($\beta = .262$; $p < .05$) have a remarkable effect on the "Perceived Usefulness". This in turn highly affects the "Intention to Use" an HR IT system ($\beta = .765$; $p < .01$) with secondary effects by the "Perceived Ease of Use" ($\beta = .156$; $p < .1$) and "Vocational and Academic Training" ($\beta = .134$; $p < .1$). The results for the identified success factors are illustrated by the following model (see Figure 2):

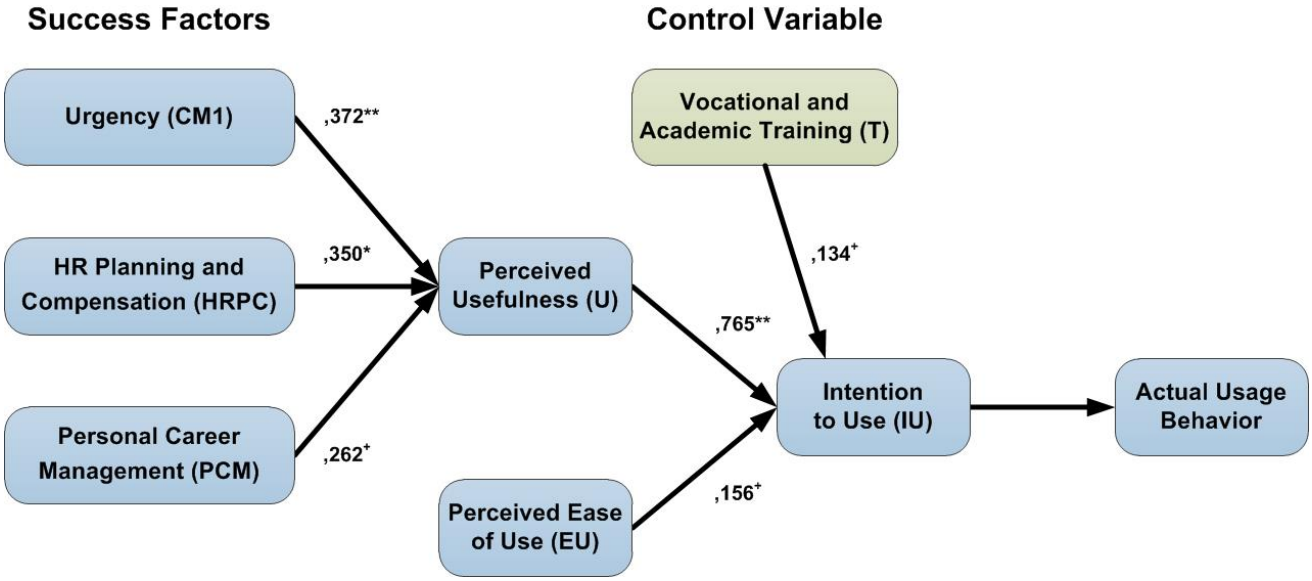

Figure 2: *Success Factors for the Acceptance of HRIS Implementation Processes*
Own illustration according to Davis et al. (1989); Davis (1989)

5. Conclusions

This examination offers some new ideas with regard to success factors for the acceptance of Information Technology (IT). Especially, the implementation processes of HRIS represent a special case of IT. Its particular requirements in form of the difficult measurement and strategy linking as well as its importance for the future justifies to be the focus of further examinations. Thereby, deliberate change management as a success factor of implementation processes should be examined extensively. Furthermore, the functions of HRIS for employees and managers should be examined more detailed. Thereby, the identified success factors determine a new contribution for predicting the success of implementation processes. Additional examinations should intend to confirm these identified success factors and distinguish them more specifically. But this examination also contains some shortcomings. On the one hand the sample size of $N = 46$ is relatively low. In fact, the central limit theorem states that, with a sample size of $N > 30$, the results are approximately normally distributed. So, this analysis complies with the minimum of a sufficient sample size. But never the less, the larger the sample size, the more precisely the estimations. Furthermore, it has to be considered that one degree of freedom is lost per independent variable in a regression analyses. This could have been the reason why the extensive model did not reveal any significant results. Additionally, the possible existence of heteroscedasticity, which has potentially been detected in the regression analyses, could contribute to an increasing probability of rejecting the hypothesis although it is true (Type I Error). On the other hand, the sample group was not absolutely representative. The results could be biased, because the corporate HR department is responsible for the corresponding implementation process. Thus, it can be assumed that they are already more progressed in the change management process than other employees of the company. Also the functions, which are perceived as important, could differ from employees in other departments or business divisions. Accordingly, the results of

this analysis cannot be transferred to the total population without restriction and should be verified.

Generally, the verified effect of creating as sense of urgency as success factor confirms the importance of a deliberate change management in implementation processes. Regarding to Kotter (1995), this is the first and crucial step for successful change processes. The other steps probably did not show such distinctive results, maybe because in this particular case the change process is still in an early stage. So, other factors like creating a clear vision or communicating the objectives with all possible means should not be neglected. Change processes will unavoidable affect the performance and productivity negatively. Employees will not totally accept announced change processes until they produce first positive results. Especially the creation of short-wins could be maintained by implementing the most important functions preferentially. Resisting employees should not be blamed for their natural behavior. Project managers have to expect resistance and cope with the employees´ fear of failure and performance setbacks.

While the implementation of a HRIS determines a considerable change process itself, the major organizational challenges for the HRM and main drivers for change should not be neglected. With regard to Greiner (1972), organizations have to pass particular challenges, whereby a crisis determines whether or not it will move forward into the next developmental phase. When "Delegation" was the basic driver of previous growth, it will at some point reach an extent to which it is hardly controllable. This emerging "Crisis of Control" can only be solved by "Coordination" and has to be maintained by sophisticated MIS. Thereby, integrated HRIS represent the appropriate tools for decision-making processes concerning HRM. These decisions determine the company´s future and breed the problems for the next crisis. Thus, deliberate HRIS could mitigate the usually subsequent "Crisis of Red Tape". Thereby, organizations have to determine their most relevant KPI´s for HR processes and link the corresponding objectives to the organization´s strategy.

According to the predicted development of future challenges for HRM, it can be assumed that the importance of IT systems for the measurement and management of HR will rise further. Thereby, it will be crucial to satisfy the needs of diversified generations and cultures at the work place. Organizations have to develop appropriate systems for recruiting, staffing, training, and retention of their employees. Efficient data processing will increasingly enable HR departments to spend less time for routine activities and facilitate effective measures, which contribute to the company´s success. While getting increasingly important for the overall business success, the role of HRM has to be strengthened in the perception of managers and HR professionals. Only if HR departments are recognized as essential business partners by the corporate management, will they be enabled to determine a sustainable competitive advantage for the future.

6. About The Author

Nicolas Reineke holds a Diploma degree in Economics from the University of the Bundeswehr in Munich. After serving as an officer in the German Armed Forces for twelve years, he participated in a semester abroad at the Queensland University of Technology in Brisbane, Australia. Afterwards, he conducted his Master Thesis during an internship at the Corporate Human Resources Department of a large logistics company and attained a MBA degree in International Business Management and Leadership from the University of Applied Sciences in Kempten. Today, Nicolas Reineke works as Consultant and Project Manager for a provider of HR Solutions and Digital Document Management. For further information about this article, contact "nicolas.reineke@gmx.de".

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