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ABSTRACT

In modern societies and in particular since the financial crisis legal requirements and regulations get more and more attention. The massive amount of regulations also affects management information systems (MIS) with an impact on both, the system level as well as the organizational level. To consider all these regulations is a challenging task for organizations which handle regulative complexity in different ways. Until now, the influence of the degree of regulation on the organization of MIS received only little attention in IS research. This paper introduces a theoretical model and research design that enables investigating the influence of regulation on the organization and success of MIS. The presented model is based on the contingency theory.

Keywords

Contingency Theory, Regulation, Compliance, Organizational Effects, Model, MIS, Success Factors

INTRODUCTION

Non-transparency and neglected reporting requirements can be identified as two reasons for the current financial crises. In particular financial institutions see them self – more than companies in other industries – confronted with an increasing number of regulations. Examples are the Markets in Financial Instruments Directive or the requirements of Basel II/III and national laws like Sarbanes Oxley Act (SOX) in the U.S. For affected companies it is a "conditio sine qua non", means it is essential to fulfill this regulations and to be "compliant". To be compliant is even more important since researchers found out that the wealth effects of non-compliant firms are significantly lower compared to the wealth effects of compliant firms regarding the compliance with SOX (Akhigbe and Martin, 2005). In part, the regulations directly influence the operation and organization of the IT, for example, in terms of operational risk management (Weiß and Winkelmann, 2011).

The increasing number of regulations combined with differing kinds to organize MIS departments, lead us to the question of how effective and efficient an IS organization works under a certain degree of regulation. To answer this question, we aim at conducting a large industry survey. As a first step, we developed a theoretical model based on the contingency theory (Kast and Rosenzweig, 1973) as well as corresponding IS research results. Hence, this article lays the theoretical foundation for an upcoming empirical insight into the efficiency and effectiveness of organizations when it comes in touch with regulations.

Due to its aim of providing a theoretical basis for a Structural Equation Modeling (SEM), the paper structure is derived from the first three steps of the framework for applying Partial Least Squares (PLS) in SEM: Problem definition & Research Design, Theoretical Foundation and Model Construction (Urbach and Ahlemann, 2010). We first define the problem that comes along with regulation and MIS. Than we introduce the theoretical foundation and application of the contingency before the theoretically derived model with its constructs will be described and argued. The paper finishes with a final discussion that contains the innovative aspects and limitations of the model.

PROBLEM DEFINITION AND RESEARCH DESIGN

Since companies of all business sectors have to design and control their processes in order to comply with an increasing number of regulations, the role of business processes and thus IT compliance is becoming more and more important (Sadiq and Governatori, 2010). Existing and changing regulations influence IS in two ways: On a process level, when processes have to be justified as well as on a data level, when new reporting and disclosure obligations have to be fulfilled. IS research cares about the complexity of regulations and its manageability in two ways: IS artefacts were introduced to include legal aspects on a process level (e.g. Becker, Bergener, Delfmann, Eggert and Weiss, 2011; Ly, Rinderle-Ma, Göser and Dadam, 2010; Olbrich and Simon, 2008) as well as on a data level (e.g. Felden, 2007; Goeken and Knackstedt, 2008; Holten, Dreiling and Schmid, 2002).

Until now, the influence of compliance requirements and regulation on the organization and success of MIS got only little or no attention within IS research. *Clark, Jones and Armstrong (2007)* explored the dynamic structure of Management Support Systems (MSS). They have done a massive literature review and derived relevant constructs that have an influence on MSS success. By using these constructs they built a dynamic system model for MSS. The degree of regulation and its effects on the MIS organization does not appear in their model. But regulations, such as the European Markets in Financial Instruments Directive (MiFID) show that law must have an influence on IS. To care about compliance is an obligation for any company. However, different companies handle regulations and their effects on MIS in different ways. For different sectors different laws and regulations exist. Additionally companies might create own business rules that have to be followed. MIS handle development and operation processes in different ways (Raymond, 1985). Consequently it seems reasonable to investigate the role of compliance within different organizational characteristics. According to the problem description, we aim for the following central research question:

> ***How does the degree of regulation influence the organization and success of MIS?***

THEORETICAL FOUNDATION

Organization Theories

A lot of different organizational theories exist, which all try to explain organizational relationships (i.e. Galbraith, 1974; Levitt and March, 1988; Schein, 1992; Williamson, 1981). They all focus on a certain scope within the domain of organization. Transaction cost theory cares about uncertainty and information asymmetries within business transactions (Williamson, 1981), organizational information processing theory deals with information processing needs, capabilities and countermeasures against uncertainty (Galbraith, 1974), Organizational Culture Theory considers employee satisfaction and commitment and the effects for the organizations success (Schein, 1992), organizational learning theory explains the relationships between an ongoing learning process and its fit with actual outcomes (Levitt and March, 1988). However, for the development of new relationships with new constructs these theories do not work for the defined problem area, because they explain existing interrelations. As a basis for new paradigms related to the influence of regulation on MIS they cannot serve as a theoretical underlying in order to explain the construct relations. Therefore, we suggest starting our theoretical framing on top of the Contingency Theory which aims at defining the dependencies between internal and external situations for organizing a corporation in a given context.

Contingency Theory and its application for MIS

Donaldson (2001) defines 'Contingency' as ''any variable that moderates the effect of an organizational characteristic on organizational performance''. The basic idea to use contingency theory as a foundation for the theoretical constructs of the developed model comes from the fact that the degree of regulation can be seen as an environmental factor. Legal requirements influence the organization of MIS from outside the company. Firms and in particular MIS have to consider regulations. As one consequence MIS must fit its organizational structure to the degree of regulation like it has to be done for the fitting between task and technology (Goodhue, 1995). Highly regulated companies will more likely tend to implement control mechanisms of i.e. software development projects or to control reporting relevant systems in order to comply with e.g. SOX. The lack of existing spreadsheet testing, for example, leads to several errors and thus compliance frauds, which in turn suggests MIS to develop control frameworks for their organizations (Panko, 2006).

Weill and Olson (1989) assess the contingency theory for its application in IS research. They developed a framework consisting of four areas that include constructs for measuring the contingency variables and their effects for MIS and the

organization. The first area contains the variables strategy, structure, size, environment, technology, task and individual. For analyzing the compliance organization and its effects on MIS, we decided to focus on the constructs environment and task. The second area is called MIS variables and contains the constructs management, implementation, structure and development. Since *MIS structure* refers to the degree of centralization and integration of MIS as well as the hardware deployment (Ein-Dor and Segev, 1982), it is not adequate to use this construct for investigating the organization and effects of IT compliance . Thus, except MIS structure, all MIS variables will be elaborated and considered in the theoretical model. The third area is called MIS performance. It measures the contingency effects on MIS performance by using the constructs satisfaction, success, effectiveness and innovativeness. The innovativeness of IT will not be part of the theoretical model because it refers to innovation of IT in providing competitive advantages (Lucas, Swanson and Zmud, 2007), which in turn is not the main purpose of IT compliance.

We exclude organizational performance and hence financial volume from our model as some researchers state that the effect of IT on organizational success can only be measured indirectly and has a time-lag. For example, *Wigand, Picot and Reichwald (1997)* argue that any gain in productivity cannot be attributed directly to IT changes but rather indirectly through new leeways in business process design and new business strategies. Another explanation could be that organizational culture and human issues initially block any performance gains (Poston and Grabski, 2001). In effect, we believe that the effect of MIS constructs to the financial volume may be too limited to offer any valuable explanation in the context of regulation.

The representation of contingency theory for IS research as well as the considered constructs within the presented model (dark grey boxes) can be seen in figure 1 and will be explained in the following.
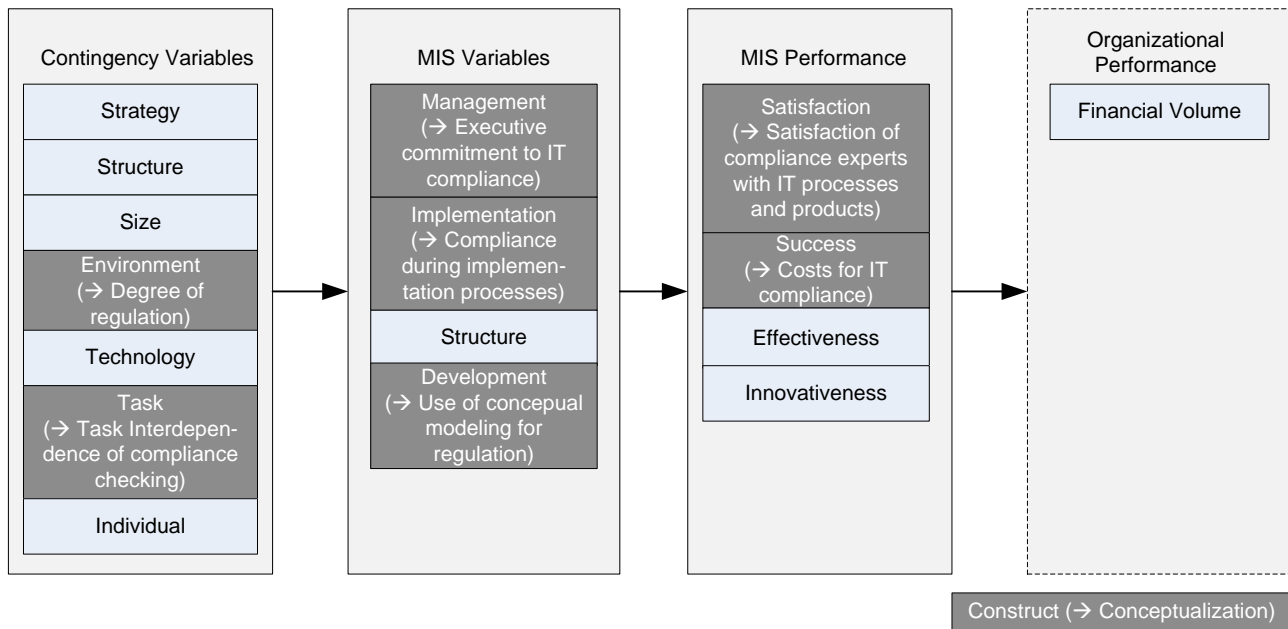

Figure 1. Representation of contingency theory for IS Research (adapted from Weill and Olson (1989))

Environment

Environment is identified as an important contingency variable for MIS (Weill and Olson, 1989) and was examined in three ways: The environment as an external factor of the organization (cf. for example *Benson and Parker (1985)*), environment as an internal factor, that describes the organizations complexity (cf. for example Ginzberg (1979)) and environment as both, a factor for the complexity of MIS environments and for the volatility of the business (cf. for example *Pyburn (1983)*). We took over the idea of both perspectives. Regulation might appear in two different ways. From an external perspective, laws influence and regulate the whole organization from outside. From an internal perspective, internal process directives or instructions given by the board of directors lead to internal regulation. External regulation should be indifferent within one industry sector and internal regulation might be different between different companies. In the following we conceptualize these thoughts by using the construct *Degree of Regulation*.

Task

Task in its original MIS sense is seen as a contingent variable, which refers to the types of activities that the information system supports (Goodhue and Thompson, 1995; Weill and Olson, 1989). The findings of *Gresov (1990)* indicate, that task dependence among horizontal and vertical units have a strong effect on the unit design within organizations. Because we want to explore the effects of different compliance organizations it seems reasonable to interpret *task interdependence* from a more organizational perspective. Concrete, we examine the task interdependence of IT compliance management. This includes compliance support support and checking whether the IT complies with all internal and external regulations.

Management

Management is one typical variable that is taken into account when assessing the function of MIS (Weill and Olson, 1989). A typical MIS design project is very complex with many stakeholders having an interest in differing designs. As such, for data warehouse and MSS success, *executive commitment* is one of the most significant influential constructs (Clark et al., 2007; Wixom and Watson, 2001). Because IT compliance is often related with costs (Bace, Rozwell, Feiman and Kirwin, 2006) and less with value creating actions, the management support for IT compliance must get particular attention when analyzing MIS variables. Jensen and Meckling (1973) proposed that companies consist of a set of agency contracts under which a principal (manager) employs agents (employees) to perform some service for him. It can be assumed that every agent is utility-maximizing, preferring more rewards and less effort. Hence, there are some discrepancies between the objectives of principal and agents, which are known as agency costs (i.e. MIS users might have different interests than compliance experts).

Implementation & Development

Implementation and development processes are often connected with *expert involvement* (Baroudi, Olson and Ives, 1986; McKeen and Guimaraes, 1997; Palanisamy and Sushil, 2001; Wixom and Watson, 2001) and formal methods for conceptual system design satisfaction (Ravichandran, 2000; vom Brocke, Becker, Simons and Fleischer, 2008). We call this construct *Formalization and Analysis of Design*. Considering regulation in MIS development and development processes is a challenging task. Compliance experts as well as system engineers have to work together which causes communication problems when there exists no common grounding (Clark and Brennan, 1996). Conceptual models help to build a common grounding between compliance experts and system engineers (Kung and Solvberg, 1986; Mylopoulos, 1992).

Success, Effectiveness & Satisfaction

Beside other factors, the success of MIS is determined by user satisfaction with the system (DeLone and McLean, 1992). For quality management this term is instantiated as *product and process quality* (Ravichandran, 2000), which are valid variables for measuring the compliance of IT systems. Literature suggests that companies using IT systems expect them to contribute to the firm's economy by processing business transactions effectively (Johnston and Lawrence, 1988; Malone, Yates and Benjamin, 1987). Typically, it is argued that the usage of reliable and suitable IT systems may improve the quality and effectiveness of operations (Poston and Grabski, 2001; Ross, 1999; Sheu, Yen and Krumwiede, 2003). Another construct that indicates the success of MIS organization is the cost factor (*MIS costs*). *Clark et al. (2007)* state in their dynamic model for MSS that as more users are involved in the development process of MSS as higher costs thereby incurred.

THEORETICAL MODEL CONSTRUCTION

Based on the theoretical foundation, the model and its hypotheses have been developed. Altogether eight constructs are derived for determining the influence of regulation on the organization and success of MIS. The constructs and its related hypotheses are depicted in figure 2. All hypotheses are either based on existing literature or on theoretical expectations. In the following we explain each hypothesis that belongs to the presented model.
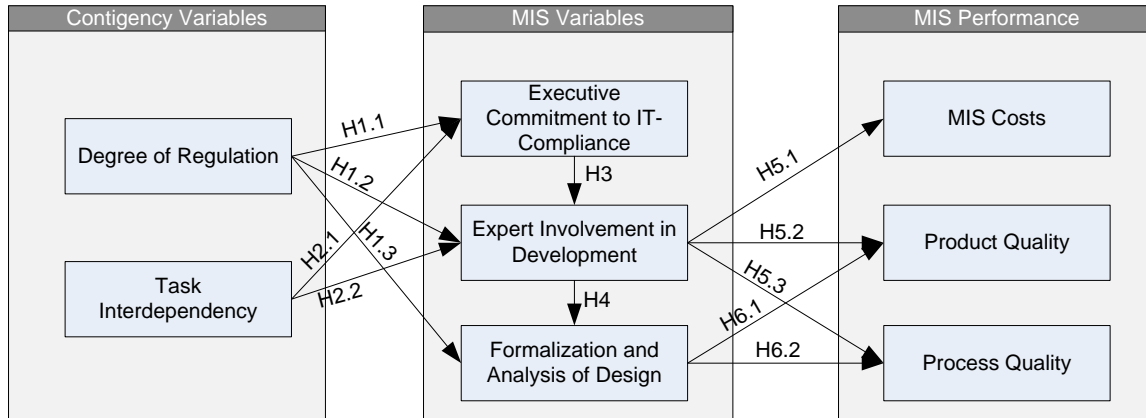
Figure 2. Theoretical model for the influence of regulation of the organization and success of MIS

H1.1: The more an organization is regulated the more executive commitment for IT compliance is needed.

The first hypothesis is based on the different objectives of principals and agents, which are known to as agency costs (Jensen and Meckling, 1973). A system designer's main goal is to achieve the defined goals and to develop systems functions. Since compliance is a separate requirement beside the raw functional requirements, its fulfillment needs a certain directive from the management as system designers do not have an incentive in following legal directives.

H1.2: The more an organization is regulated the more compliance experts have to be involved in IS development processes.

Gales and Mansour-Cole (1995) found a relationship between uncertainty and user involvement. The more uncertainty exists the more users should be involved in IS development projects. To transfer these findings to the influence of compliance, a stronger involvement of compliance experts can be expected when a higher degree of regulation appears.

H1.3: More Regulation leads to more formalized design and analysis approaches for IS development.

The relationship between the degree of regulation and formal system design and analysis methods is based on complexity considerations. Conceptual models describe the physical and the social world to understand and support communication between stakeholders (Mylopoulos, 1992). As more complex the *physical and the social world* as more communication is needed for its understanding and the preparation of a common grounding (Clark and Brennan, 1996).

H2.1: A more interdependent task of compliance checking of IS requires more executive commitment to IT compliance.

If the task of checking compliance becomes more interdependent – hence more than one organizational unit (e.g. compliance management) is necessary for the task fulfillment – belonging project members must get the permission from their management to work on that project. In effect, units have additional effort when involving their people in a compliance checking project, which needs a particular management support.

H2.2: A more interdependent compliance checking task leads to stronger involvement of compliance experts in development processes.

If an organization designs the task of checking the compliance of information systems as an interdependent task (e.g. compliance experts are asked to work together with system engineers) a stronger involvement of compliance experts in design processes is assumed.

H3: More executive commitment leads to more involvement of compliance experts in development processes.

Hypothesis 3 is derived from findings in literature, where a positive correlation between management support and expert involvement was found (Clark et al., 2007). Based on these findings we assume that there also exist a positive relation between management support and the involvement of compliance experts in the IS design processes.

H4: More involvement of compliance experts in development processes leads to more formal design and analysis approaches.

Communication theory (Clark and Brennan, 1996) argues that a common grounding is necessary to exchange knowledge. Combining this fact with the communication and understanding purpose of conceptual modeling (Mylopoulos, 1992), we expect a positive correlation between the involvement of compliance experts in design processes and the usage of formal design and analysis methods.

H5.1:   More compliance experts being involved in IS development processes leads to relatively higher MIS costs.

Based on the dynamic system model, introduced by *Clark et al. (2007)*, this positive correlation is already assumed in the area of MSS. In effect, we also assume a positive relation between the involvement of compliance experts and the relative costs for MIS.

H5.2:   A stronger involvement of compliance experts in IS development processes will lead to more compliant MIS products.

The positive influence of user involvement on the success of MIS was established by a couple of studies (Baronas and Pearson, 1983; Baroudi et al., 1986; Tail and Vessey, 1988). Based on these findings we also assume a positive correlation between the involvement of compliance experts and the quality of information systems regarding their compliance with regulations.

H5.3:   A stronger involvement of compliance experts in IS development processes will increase of development processes.

Like for the assumed positive correlation between the involvement of compliance experts and the quality of information systems, the IS design process is also positively affected by the inclusion of compliance experts. Considering empirical findings that indicate a positive relation between user involvement and project implementation success (Wixom and Watson, 2001), this assumption becomes meaningful.

H6.1:   The use of more formal design and analysis methods leads to more compliant IS products.

From a quality management perspective the use of formal methods within the design process of IS is one of the identified factors that leads to a higher IS product quality (Ravichandran, 2000). Combining these findings with conceptual modeling and communicational considerations (Clark and Brennan, 1996; Mylopoulos, 1992), a positive correlation between formal method usage and IS product quality regarding compliance with regulations can be assumed.

H6.2:   The use of more formal design and analysis methods leads to better IS process quality.

Failures and misunderstandings in effect of a complex regulation environment are expected based on problems communication and understanding problems (Clark and Brennan, 1996; Mylopoulos, 1992) between compliance experts and system designers. In addition, formal methods are seen as one factor that influence the quality of IS development (Doy, 2003; Ravichandran, 2000). Taking into account that regulations might be very complex conceptual models that contain legal requirements are expected to help preventing failures and rework.

DISCUSSION

So far, research in the area of contingency does not address legal aspects. This research gap becomes more important as the increasing number of regulations forces companies to react to it and science does not provide any theoretical founding so far. Regulations combined with differing kinds to organize MIS departments, lead us to the question of how effective and efficient an IS organization works under a certain degree of regulation. Our research approach aims at opening a novel area of IS research, namely the transfer of regulatory requirements to IS and its organizational implementation within the company.

From a practical perspective, we expect the model and its empirical results to present guidelines on how to effectively and efficiently establish a compliance understanding and hence an organizational structure within the company. For example, we argue for a strong executive commitment, the integration of compliance savvy employees and a suitable representation of legal requirements through formal methods and tools in order to ensure compliant MIS design.

So far, our model is designed only on theoretical and argumentative considerations. Other contingency variables, which are not considered in the proposed model, have to be investigated in further research. In addition, the initial model does not take cultural differences between different countries and enterprises into consideration. Furthermore, as being an initial study we treat regulatory requirements as one block and do not differentiate between different compliance rules. Since we do not want to overwhelm respondents with a too big questionnaire, it is meaningful to shrink the scope to the most important constructs.

OUTLOOK

The here presented model fills a gap in IS research. Until now IS research is not focused on regulation and its organizational consequences (Clark et al., 2007). Thus it is important to discuss the theoretical basis before an extensive study will be conducted. Further research may be conducted on the model itself, i. e. examination of other contingency constructs related to regulation as well as on the data collection to test the theoretically derived hypotheses.

According to *Urbach and Ahlemann (2010)* the next three steps of conducting a SEM study is to collect the data, to validate the model and to interpret the results. Consequently these steps have to be done to finalize the work and to test the hypotheses. The participants for the analysis will come from different branches because in this way we can compare the influence of a different degree of regulation. An online survey is planed together with an IT-security journal that addresses compliance experts in different companies. For the retail and public sector the survey will be conducted paper based on two large business conferences in Germany. At first we will focus on German participants. In a second step an international study will take place.

However, we see this foundational work of setting up an initial model as a necessary basis for an upcoming empirical testing of our hypotheses. The empirical validation may not support some hypotheses or may bring to light new correlations. During our preliminary considerations we came to the conclusion that an empirical testing necessarily needs to gain information from various industries. This is due to the fact that regulatory requirements differ from industry to industry. The presented theoretical model is a first fundamental step to understand the relation between the degree of regulation and the organization and success of MIS.

REFERENCES

1. Akhigbe, A., and Martin, A.D. (2005) Valuation impact of Sarbanes–Oxley: Evidence from disclosure and governance within the financial services industry, *Journal of Banking & Finance,* 2006, 30, 989-1006.

2. Bace, J., Rozwell, C., Feiman, J., and Kirwin, B. (2006) *Understanding the Costs of Compliance* Gartner Research. Gartner, Inc., 2006.

3. Baronas, J.E., and Pearson, S.W. (1983) Development of a Tool for Measuring and Analyzing Computer user Satisfaction, *Management Science,* 29, 5, 530-545.

4. Baroudi, J.J., Olson, M.H., and Ives, B. (1986) An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction, *Communication of the ACM,* 29, 3, 232-238.

5. Becker, J., Bergener, P., Delfmann, P., Eggert, M., and Weiss, B. (2011) Supporting Business Process Compliance in Financial Institutions – A Model-Driven Approach, 10. Internationale Tagung Wirtschaftsinformatik (Wi2011), Zurich, Switzerland, 2011.

6. Benson, R., and Parker, M. (1985) *Enterprise-Wide Information Management—An Introduction to the Concepts* IBM Los Angeles Scientific Center, Los Angeles, 1985.

7. Clark, H.H., and Brennan, S.E. (1996) Grounding in Communication, in: *Perspectives on Socially Shared Cognition,* L.B. Resnick, J.M. Levine and S.D. Teasley (eds.), Amer Psychological Assn, 1996.

8. Clark, T.D., Jones, M.C., and Armstrong, C.P. (2007) The Dynamic Structure of Management Support Systems: Theory Development, Research Focus, and Direction, *MIS Quarterly,* 31, 3, 579-615.

9. DeLone, W.H., and McLean, E.R. (1992) Information Systems Success: The Quest for the Dependent Variable, *Information Systems Research,* 3, 1, 60-95.

10. Donaldson, L. (2001) *The contingency theory of organizations* Sage Publications, Thousand Oaks, CA, 2001.

11. Doy, D. (2003) Conceptual Modeling and System Architecting, *Communications of the ACM,* 46, 10, 62-65.

12. Ein-Dor, P., and Segev, E. (1982) Organizational Context and MIS Structure: Some Empirical Evidence, *MIS Quarterly,* 6, 3, 55-68.

13. Felden, C. (2007) Multidimensional XBRL, in: *New Dimensions of Business Reporting and XBRL,* R. Debreceny, C. Felden and M. Piechocki (eds.), Wiesbaden, 2007, 191-210.

14. Galbraith, J.R. (1974) Organization design: An information processing view, *Interfaces,* 4, 3, 28-36.

15. Gales, L., and Mansour-Cole, D. (1995) User involvement in innovation projects: Toward an information processing model, *Journal of Engineering and Technology Management,* 12, 1-2, 77-109.

16. Ginzberg, M.A. (1979) A study of the implementation process, *TIMS Studies in Management Science,* 13, 85-102.

17. Goeken, M., and Knackstedt, R. (2008) Referenzmodellgestütztes Compliance Reporting am Beispiel der EU-Finanzmarktrichtlinie MiFID, *HMD – Praxis der Wirtschaftsinformatik,* 263, 47-57.

18. Goodhue, D.L. (1995) Understanding user evaluations of information systems, *Management Science,* 41, 12, 1827-1844.

19. Goodhue, D.L., and Thompson, R.L. (1995) Task-Technology Fit and Individual Performance, *MIS Quarterly,* 19, 2, 213-236.

20. Gresov, C. (1990) Effects of Dependence and Tasks on Unit Design and Efficiency, *Organization Studies,* 11, 4, 503-529.

21. Holten, R., Dreiling, A., and Schmid, B. (2002) Management Report Engineering – A Swiss Re Business Case, in: *From Data Warehouse to Corporate Knowledge Center,* E. Maur and R. Winter (eds.), Springer, Heidelberg, Germany et al., 2002, 421-437.

22. Jensen, M.C., and Meckling, W.H. (1973) Theory of the firm: managerial behavior, agency costs and ownership structure, *Journal of Financial Economics,* 3, 4, 305-360.

23. Johnston, R., and Lawrence, P. (1988) Beyond vertical integration — the rise of the value-adding partnership., *Harvard Business Review,* July-August, 94-101.

24. Kast, F., and Rosenzweig, J. (1973) *Contingency Views of Organization and Managemeni* Science Research Associates, Chicago, 1973.

25. Kung, C.H., and Solvberg, A. (1986) Activity modelling and behaviour modelling, in: *Information Systems Design Methodologies: Improving the Practice, IFIP,* T.W. Olle, H.G. Sol and A.A. Verrijn-Stuart (eds.), Amsterdam, North-Holland, 1986, 145-171.

26. Levitt, B., and March, J.G. (1988) Organizational Learning, *Annual Review of Sociology,* 14, 319-340.

27. Lucas, H.C., Swanson, E.B., and Zmud, R.W. (2007) Implementation, Innovation, and Related Themes Over The Years In Information Systems Research, *Journal of the Association for Information Systems,* 8, 4, 206-210.

28. Ly, L.T., Rinderle-Ma, S., Göser, K., and Dadam, P. (2010) On enabling integrated process compliance with semantic constraints in process management systems, *Information Systems Frontiers*.

29. Malone, T., Yates, F., and Benjamin, R. (1987) Electronic markets and electronic hierarchies, *Communication of the ACM,* 6, 485-497.

30. McKeen, J.D., and Guimaraes, T. (1997) Successful Strategies for User Participation in Systems Development, *Journal of Management Information Systems,* 14, 2, 133-150.

31. Mylopoulos, J. (1992) Conceptual modeling and telos, in: *Conceptual Modeling, Databases, and CASE: An Integrated View of Information Systems Development,* P. Loucopoulos and R. Zicari (eds.), John Wiley and Sons Inc., New York, 1992.

32. Olbrich, S., and Simon, C. (2008) Process Modelling towards e-Government – Visualisation and Semantic Modelling of Legal Regulations as Executable Process Sets, *The Electronic Journal of e-Government,* 6, 1, 43-54.

33. Palanisamy, R., and Sushil (2001) Empirically Testing the Relationships Between User Involvement, Information Waste, and MIS Success, *Journal of Services Research,* 1, 1, 70-104.

34. Panko, R.R. (2006) Spreadsheets and Sarbanes-Oxley: Regulations, Risks, and Control Frameworks, *Communications of AIS,* 2006, 17, 2-50.

35. Poston, R., and Grabski, S. (2001) Financial impacts of enterprise resource planning implementations, *International Journal of Accounting Information Systems* 2, 4, 271-294.

36. Pyburn, P.J. (1983) Linking the MIS plan with corporate strategy: an exploratory study, *MIS Quarterly,* 7, 2, 1-14.

37. Ravichandran, T. (2000) Quality Management in Systems Development: An Organizational System Perspective, *MIS Quarterly,* 24, 3, 381-415.

38. Raymond, L. (1985) Organizational Characteristics and MIS Success in the Context of Small Business, *MIS Quarterly,* 9, 1, 37-52.

39. Ross, J.W. (1999) Surprising facts about implementing ERP, *IT Professional,* 1, 4, 65-68.

40. Sadiq, S., and Governatori, G. (2010) Managing Regulatory Compliance in Business Processes, in: *Managing Regulatory Compliance in Business Processes,* J. vom Brocke and M. Rosemann (eds.), Springer, Heidelberg, 2010, 159-175.

41. Schein, E.H. (1992) *Organizational Culture and Leadership*, (2nd ed.) Jossey-Bass, San Francisco, 1992.

42. Sheu, C., Yen, H.R., and Krumwiede, D.W. (2003) The effect of national differences on multinational ERP implementation: An exploratory study, *TQM & Business Excellence,* 14, 6, 641-657.

43. Tail, P., and Vessey, I. (1988) The effect of User Involvement on System Success: A Contingency Approach, *MIS Quarterly,* 12, 1, 91-108.

44. Urbach, N., and Ahlemann, F. (2010) Structural Equation Modeling in Information Systems Research Using Partial Least Squares, *Journal of Information Technology Theory and Application,* 11, 2, 5-40.

45. vom Brocke, J., Becker, J., Simons, A., and Fleischer, S. (2008) Conceptual Modeling of Enterprise Content, 7th International Conference on Perspectives in Business Informatics Research (BIR), Gdańsk, Poland, 2008.

46. Weill, P., and Olson, M.H. (1989) An Assessment of the Contingency Theory of Management Information Systems, *Journal of Management Information Systems,* 6, 1, 59-85.

47. Weiß, B., and Winkelmann, A. (2011) Developing a Process-Oriented Notation for Operational Risks in the Financial Sector – A Conceptual Metamodel for Risk Modeling in Business Process Models, 44th Hawaii International Conference on System Sciences (HICSS 2011), Koloa, USA, 2011.

48. Wigand, R.T., Picot, A., and Reichwald, R. (1997) *Information, Organization and Management – Expanding Markets and Corporate Boundaries*, Chichester, 1997.

49. Williamson, O.E. (1981) The economics of organization: The transaction cost approach, *The American journal of sociology,* 87, 2.

50. Wixom, B.H., and Watson, H.J. (2001) An Empirical Investigation of the Factors Affecting Data Warehousing Success, *MIS Quarterly,* 25, 1, 17-41.