# FACTORS INFLUENCING CONTROLLEES' CONGRUENCE AND WILLINGNESS TO COMPLY WITH CONTROL MECHANISMS IN IS PROJECTS

*Research in Progress*

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## Abstract

*Control is typically seen as a dyadic relationship, meaning that there is a controller who exercises control over another person, the controllee. Until now, research in the field of IS project control mainly focused on the controller perspective, covering aspects like control choices and its effects on project performance. This unilateral research focus has led to gaps regarding the controllee's perspective on control mechanisms - neglecting influence of the controllee's resulting behavior on control efficiency and effectiveness. The ongoing research presented in this paper therefore aims at investigating the factors that determine congruence between controller and controllee in an IS project setting. For this purpose, a quantitative vignette study will be conducted as an approach that is able to combine the advantages of both qualitative and quantitative research methods. Potential findings include a considerable impact of a controllee's congruence on compliance with IS project control mechanisms. Maximizing the level of congruence could improve IS project control efficiency and effectiveness and thus help increasing IS project success.*

*Keywords: vignette study, congruence, IS project success, perceived appropriateness of control mechanisms, dyadic control relationship*

## 1 Introduction and Relevance

Over the last decades, project management has attracted increasing attention both in science and practice. Organizations started creating bodies of knowledge defining de facto standards and developed tools that are now applied worldwide (Morris et al., 2006). Today, firms across various industries recognize the high relevance of project work for value creation (Winter and Szczepanek, 2008). While successful management of projects therefore becomes more and more crucial for corporate success, project success rates have not significantly improved (Mir and Pinnington, 2014). This applies in particular to Information Systems (IS) projects where risk is often underestimated (Flyvbjerg and Budzier, 2011) and failure rates are typically even higher (Irani, 2010). The Standish Group's 2015 'Chaos report' shows that in 2015, only 29% of approximately 50,000 evaluated IS projects around the world were successfully implemented on time, budget and with a satisfactory result (Hastie and Wojewoda, 2015).

One common approach to increase efficiency and overall project success is the exercise of control, which aims at influencing the employees' behavior in a way that helps achieving organizational goals (Kirsch, 1996). There is strong agreement on the fact that control has a performance-enhancing effect in internal IS projects (Wiener et al., 2016). Control is typically seen as a dyadic relationship (Kirsch, 2004), meaning that one person ('controller') exercises control over another person ('controllee'). This principle can also be found in the popular 'Agency Theory' (Eisenhardt, 1989), which has been applied to better understand and improve the outcome of IS projects (Mahaney and Lederer, 2003).

However, while the overall positive effect of control on IS project performance seems to be indisputable, Wiener et al. (2016) find that most research uses survey data collected only from one side of the control dyad: the controlling part. As a result, the influence of the controllee perspective on IS project control efficiency and effectiveness is implicitly neglected. This is surprising as previous research has indicated that achieving congruence between controller and controllee can minimize control loss (Narayanaswamy et al., 2013). In addition, research so far lacks a clear definition of congruence in the context of IS project control. This includes a weak understanding of the potential factors determining congruence between controller and controllee on project control.

Therefore, this ongoing research explores the relevance of controller/controllee congruence for willingness to comply with IS project control mechanisms. The results might help project managers to build and communicate a control portfolio that is also understandable and perceived as appropriate by the controllees. Arguably, a higher level of perceived appropriateness would increase the controllees' willingness to comply with control mechanisms and thus control efficiency and effectiveness. This paper presents research that is in progress and will be structured as follows: In the subsequent chapter, we will discuss underlying state-of-the-art concepts as well as previous findings in the field. The aim and research objectives will then be further explained and poured into a concrete research question. The third chapter will give more information about vignette studies as the chosen research methodology. Finally, we will close the paper with a brief presentation of the research's anticipated results.

## 2      State of the Field and Aim of Research

For over half a century, researchers have been investigating organizational control processes and their influence on organizational performance (Tannenbaum, 1962). Broadly viewed, control can be defined as "all attempts to ensure individuals in organizations act in a manner that is consistent with meeting organizational goals and objectives" (Kirsch, 1997, p. 215). Over the last two decades, technological progress and distribution has shifted scientific attention towards IS-related controls. Reviewing literature on IS project control, Wiener et al. define control as "any attempt to align individual behaviors with organizational objectives" (Wiener et al., 2016, p. 742). Today, controls are omnipresent and exercised not only in the operating business, but also within the project setting. Based on the definitions of Kirsch (1996) and Wiener et al. (2016), we define project control as any attempts to lead project team members to complete an IS project within time, budget and in the desired quality. IS project control can therefore be seen as the sum of control mechanisms (e.g. filling in a time sheet) that are implemented in a project setting. Generally, there is great consensus that efficient and effective control is crucial for an IS project's success (e.g. Bernroider and Ivanov, 2011; Gardiner and Stewart, 2000; Might, 1984; Shenhar et al., 2001; Westerveld, 2003; de Wit, 1988).

As compared to projects in other fields, IS-related projects indicate several aggravating characteristics. Just to name a few: (1) due to the high complexity of information systems, projects in this field are particularly prone to escalation (Mähring and Keil, 2008), (2) the intangibility of software deliverables and outcome leads to an optimistic bias regarding status reports (Snow et al., 2007), (3) the IT department usually has technical expertise but not the depth of a line function's domain knowledge (Tiwana, 2009), and (4) uncertain business needs result in unclear project objectives (Whyte and Bytheway, 1996). As a consequence, IS-related projects are subject to increased risk which, in turn, emphasizes the need for control (Wiener et al., 2015). However, this might result in the misleading belief that 'more is better', implementing an exaggerated project control set that is not supported by the con-

trolled employees. In the end, this could lead to inefficient or ineffective control mechanisms that do not support or even impede project success.

## 2.1 Modes of Control

The mode of control can be expected to influence an employee's willingness to comply with a given control mechanism. For instance, the willingness might be different for formal controls (e.g. keeping a log of working hours) compared to informal controls (e.g. weekly rough verbal communication of working hours). Eisenhardt (1985) found that employees' behavior observability determines the management's choice of control types. Seen from another perspective, behavior observability might also influence controllees' willingness to comply with project control mechanisms. That is because, depending on the mode of control, if behavior can be neither rewarded nor penalized there might be no incentive for the controllee to behave in accordance to the implemented control mechanisms. Thus, knowledge about the different modes of control will help to better differentiate the results of our research and might avoid or reduce biases.

| Control Mode | Key Characteristics | Examples of Mechanisms | |
|---|---|---|---|
| **Input** | Monitoring resource allocations (human, financial, and material), rewards based on effective and efficient resource allocation and utilization | Recruitment of project manager and staff, trainings, manpower allotments, job trainings | **Formal** |
| **Behavior** | Rules and procedures, articulated rewards based on following rules and procedures | Development methodology, job description, supervisor-subordinate hierarchy, work assignment, rules and procedures | |
| **Outcome** | Outcomes and goals articulated, rewards based on producing outcomes and goals | Defined target implementation date and/or budget, expected level of performance, defined project milestones | |
| **Clan** | Common values, beliefs and problem-solving philosophy, identification and reinforcement of acceptable behaviors, specific task goals evolve | Coalitions of individuals with shared ideologies, socialization, hiring and training practices, implemented rituals and ceremonies | **Informal** |
| **Self** | Individual defines task goals or procedures, individual monitors, rewards, sanctions self-rewards based, in part, on individual's self-control skills | Individual empowerment, self-management, autonomy in what individual does on job, autonomy in how individual does the work, self-set goals, self-monitoring, self-rewarding | |

*Table 1.        Modes and mechanisms of control, adapted from L. S. Kirsch (1997) and (Wiener et al., 2016)*

A widely accepted approach for classifying control in the context of IS project management is the so-called 'Kirsch Typology' (Kirsch, 1997; Wiener et al., 2016). An adapted version can be found in table 1. Based on previous research of Ouchi (1977), Kirsch and Wiener et al. distinguish control mechanisms targeting at five different control modes: input, behavior, outcome, clan and self. They suggest to implement and execute them depending on task characteristics, role expectations, project-related knowledge and skills (Kirsch, 1997). Control modes can be further categorized in formal and informal modes of control.

Input, behavior and outcome are regarded as formal control (Wiener et al., 2016). Input control refers to retaining a qualified and stable project team (Vlasic and Yetton, 2004). Behavior control should only be implemented if the controllee's behavior is observable and a desired behavior is known by the management or controller. Based on their compliance with the desired behavior, controllees are being rewarded or penalized. Behavioral control might include a variety of mechanisms such as regular reports, status meetings, conference calls or implementation and enforcement of methodologies (Henderson and Lee, 1992; Kirsch, 1997; Pinto et al., 1993). Outcome control rewards or penalizes a

controllee's delivery conformance. In IS projects, output could be project milestones, a defined target implementation date or also the fulfillment of functional specifications.

Informal controls focus on socialization and thus cannot be operationalized to the same extent as formal controls. In case of clan controls, the controller tries to establish desired common values and beliefs through shared experiences and rituals (Choudhury and Sabherwal, 2003). Control therefore stems from sharing norms and values within a group of individuals (Kirsch, 1996). The second informal control mode, self-control, is "a function of individual objectives and standards […] and intrinsic motivation" (Kirsch, 1996, p. 218). The controller cannot enforce but only facilitate the execution of self-control, e.g. through training of appropriate techniques, clearly defined tasks or performance evaluation schemes (Choudhury and Sabherwal, 2003).

## 2.2    Control Congruence

First academic attempts to define congruence were made in the field of organizational strategy in the 1960s (Hatton and Raymond, 1994). Here, congruence was thought to help "synchronizing the complex elements of a business firm for achieving an effective implementation of a chosen strategy" (Hatton and Raymond, 1994, p. 78). Pinto et al. (1987) used the term in an article about critical factors for successful project implementation, where they define congruence as the extent to which the project team members' understanding of project objectives is consistent with the overall organizational goals (Pinto and Slevin, 1987).

Investigating IS project control efficiency, Tiwana & Keil (2009) introduced a conceptual distinction between '*attempted* and *realized* control'. *Attempted* control refers to control that is implemented by a controller "independent of whether or how they are exercised" (Tiwana and Keil, 2009, p. 13). *Realized* control includes any control mechanisms that are successfully exercised, i.e. they are acknowledged and put into action by the controllees. For the purpose of the ongoing research, it is argued that the level of control congruence between controller and controllee is one main factor determining the gap between *attempted* and *realized* control. Based on findings of current research in the field, control congruence might be determined by two main factors. First, by the level of a controllee's contentwise understanding of a control mechanism, meaning that the controllee is aware of the control's contents and objectives as intended by the controller. Second, the degree of perceived appropriateness; the higher the respective level of congruence between controller and controllee, the lower the gap between *attempted* and *realized* control. The following two paragraphs will introduce the concepts of contentwise understanding and perceived appropriateness in more detail.

Firstly, regarding congruence in terms of contentwise understanding, Narayanaswamy et al. (2013) find that a lack in communicational congruence contributes to project failure. More precisely, they argue that ensuring communicational congruence between project manager and project members can reduce control loss (Narayanaswamy et al., 2013). This concept is comparable to Ouchi's transmission consistency (1978), which focuses on misunderstandings and distortion when delegating control. Such misunderstandings are common when transmitting control through organizational hierarchy and they might occur either unintentionally or intentionally (Ouchi, 1978). Thus, it is argued that controllees are not able to act (fully) compliantly if they do not understand the contents of the respective control mechanism. This includes knowledge about all necessary work steps that have to be performed by the controllee as intended by the controller.

Secondly, the level of perceived appropriateness from a controllee's viewpoint constitutes the other main factor determining congruence. Perceptual (also: *evaluational*) congruence corresponds to the level of agreement between controller (project manager) and controllee (project team member) on how appropriate control is (Narayanaswamy et al., 2013; Wiener et al., 2016). It is argued that the control amount has a significant impact on a controllee's perceived control appropriateness. Following Rustagi et al. (2008), control amount includes the variety and intensity of selected controls. We expect that a controllee's willingness to comply with implemented project control mechanisms is positively correlated with the level of perceived appropriateness. To give an example, for more complex and re-

source-intensive ERP projects with high levels of variation (Bernroider, 2013), a larger control amount might be perceived as appropriate by the controllees. On the other side, control mechanisms implemented in a small project might result in a low level of congruence regarding perceived appropriateness. This could be the case if controllees regard implemented control mechanisms as too intrusive or time consuming in a smaller project of low complexity. Controllees then might keep information private, generally behave in an uncooperative manner or even provide false information intentionally.

Apart from the two previously introduced main factors, congruence is presumably influenced by various more or less apparent aspects. For instance, the dyadic control relationship unavoidably leads to the so-called 'agency problem' that has been described in agency theory. It refers to a conflict of interest that occurs in any relationship where a party (agent) is expected to act in another party's (principal) best interest (Dyl, 1988). According to Eisenhardt (1989), this problem yields two aspects: (1) the desires or goals of the principal and agent might conflict (also referred to as the 'agency dilemma' and (2) it might be difficult and/or expensive for the principal to verify the actual behavior of the agent. In software development projects in particular, limited observability induces developers to take shortcuts, which decrease software quality (Austin, 2001). Figure 1 gives an overview of potential factors influencing willingness to comply with IS project control mechanisms. It is important to note that these factors are only preliminary (literature based) and will be subject to further exploratory research.
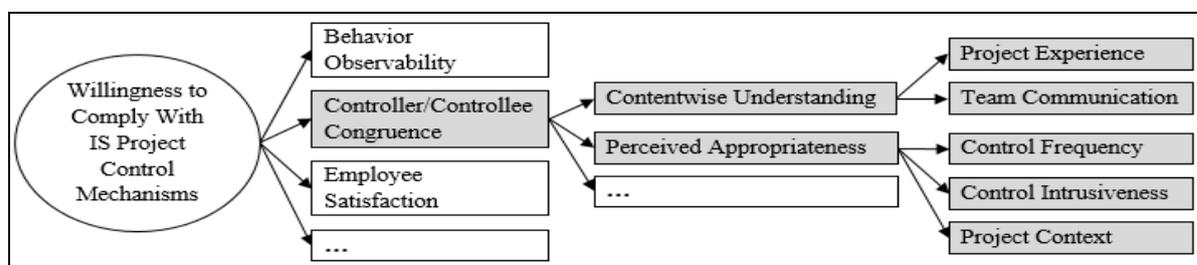


*Figure 1          Overview of potential factors influencing congruence in IS project control*

## 2.3     Aim of Research

Based on the findings of a systematic literature review by Leidner & Kayworth (2006), Wiener et al. (2016) propose an expanded theoretical framework by adding the aspect of control enactment, which includes control style and congruence. Although numerous approaches investigate the effects of control on employee satisfaction and motivation (e.g. Cheney, 1984; Henderson and Lee, 1992; Santana and Robey, 1995), existing literature mainly focuses on the controller perspective and neglects the relevance of the controllee's perspective. One exception can be found in Remus et al. (2016), where the authors suggest to consider control effects at the controllees' individual level (Remus et al., 2016). Thinking one step further, it is arguable that a controllee might behave detrimentally if there is a low level of congruence between controller and controllee regarding project control. Such detrimental behavior can take the form of the controllee keeping project information private or even distorting requested information, which in turn, leads to a decreased control efficiency and effectiveness. In case of policies or methodologies, a controllee's misunderstanding might lead to intentionally or unintentionally diverging behavior. As Nidumolu and Subramani state, "management controls need to impose discipline and coordinate action to ensure goals are met while simultaneously incorporating autonomy to motivate software developers to be innovative and produce quality work" (Nidumolu and Subramani, 2003, p. 159). In a similar vein, Tiwana and Keil find conflicting advice on the suitability of different control approaches in software development projects and argue that literature follows an untested assertion that "greater control enhances systems development performance" (Tiwana and Keil, 2009, p. 10).

Keeping these considerations in mind, the aim of the ongoing research is to close the current gap in research and gain a better understanding of the determinants of controller/controllee congruence on control compliance and IS project success. For this purpose, the following research question has been

derived: "*What factors determine the level of congruence between controller and controllee on IS project control mechanisms and how does congruence influence a controllee's willingness to behave in a compliant manner?*"

# 3    Research Methodology

An experimental vignette study will be conducted to investigate factors that might influence the controllees' willingness to comply with IS project control mechanisms. In short, the vignette technique combines an experimental task as main part and a classical survey to measure respondent-specific characteristics (Atzmüller and Steiner, 2010). It thus tries to combine the best of both worlds. An overview of the strengths and weaknesses of surveys and experiments regarding validity is given in table 2. External validity describes the degree to which the results are warranted to be generalized to other contexts. Internal validity describes the extent to which the results are attributable to the independent variable(s) and not to some other rival explanation.

|  | **Survey** | **Experiment** |
|---|---|---|
| **Strengths** | High external validity (representative, multivariate and multivalent measurements) | High internal validity (orthogonal design plans and active mode of measurement enabled by the controllee intervention) |
| **Weaknesses** | Low internal validity (multicollinearity of measured variables and passive way of measuring) | Low external validity (none-representativeness and oversimplified setting) |

*Table 2.        Surveys and experiments, derived from Atzmüller & Steiner (2010)*

To understand causal relationships, experiments (Lutz, 1977) or quasi-experiments (Grant and Wall, 2009) are typically used, which offer an invaluable resource for "building, refining, accumulating, and applying knowledge about organizational life" (Grant and Wall, 2009, p. 653). According to Highhouse, randomized experiments are "the most potent research design for determining whether or not x causes y" (Highhouse, 2009, p. 554). Moreover, he points out the importance of methods that go beyond the predominantly applied passive observation because no statistical procedure will be able to meet the requirements for inferring causation (Highhouse, 2009). Web experiments also provide the possibility to address new target groups in research, e.g. children (Reips, 2000). However, experiments in general also come up with some disadvantages. For instance, the so called Hawthorne effect describes that the subjects' knowledge of being part of an experiment influences their behavior (Adair, 1984). In connection with the rather small sample sizes (especially for more time consuming and costly traditional, non-web experiments), this circumstance might lead to limited external validity (Reips, 2000). Vignette studies combine the advantages while addressing the shortcomings both from classical surveys and experiments and are therefore a promising but yet underrepresented methodology.

Although history of vignette studies goes back almost 40 years (Burstin et al., 1980) and empirical findings are recognized by the scientific community, only little attention is given to vignette studies (Atzmüller and Steiner, 2010). Also Wiener et al. (2016) notice a gap in use of other methods than surveys and case studies in research of IS project control, for instance experiments or multimethod approaches. Vignette studies might also be referred to as a scenario-based data gathering technique and are widely used in business ethics research (e.g. Aguinis and Bradley, 2014; Weber, 1992). Interestingly, in IS research an increasing number of vignette-based research is being conducted in the field of security policy compliance (e.g. Barlow et al., 2013; Siponen and Vance, 2010).

Quantitative vignette studies consist of two components. First, the presentation of a short vignette forms the main part. Vignettes are short descriptions of person, situation and object that are given to respondents of a survey in order to gain knowledge about their judgments about these scenarios (Atzmüller and Steiner, 2010). In a second part, a short survey measures respondent-specific characteristic (sociodemographic data). This information can then be used as covariates in the analysis of

vignette data (Atzmüller and Steiner, 2010) and finally provides the opportunity for generalizing the findings to a certain degree.

Participants of vignette studies are typically confronted with a set of single vignettes to better elicit the participants' "beliefs, attitudes, judgments, knowledge, or intended behavior with respect to the presented vignette scenarios" (Atzmüller and Steiner, 2010). Because vignette realism is crucial for the validity and significance of its results (Evans et al., 2015), an assessment will be included for every vignette presented in the study. When formulating vignettes, it is also essential to avoid superficiality but to formulate them in a way that they cover the real world to the highest possible degree. Evans et al. (2015) offer a guideline of 15 recommendations for vignette content that will be considered when formulating the vignettes (for paper length restrictions, we cannot present them here).

Figure 2 gives an exemplary vignette that could be used as one of several vignettes in the survey. It is intended to demonstrate the rough structure of a vignette in the context of IS project control without laying any claim to completeness or appropriateness of the factors. Only for the purpose of illustration within this paper, the factors of this vignette are printed in bold and are numbered (1 to 5). The five factors and possible manifestations in this example are as follows:

(1) control mechanism            centrally stored Excel-based sheet / paper-based tracking sheet
(2) control frequency              at the end of every working day / week / at one's own discretion
(3) contentwise understanding    did not exactly know how to fill / was familiar with filling
(4) personal circumstances        stressful day, worked 9 hours / pleasant day / worked 8 hours
(5) framework conditions         about 2 weeks behind /ahead of schedule / on schedule

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In the development project of a new smartphone app, the project staff was told to always update a **centrally stored Excel-based sheet** *(1)* **at the end of every working day** *(2)* for tracking work progress. Bob was rather new in the project team and **did not exactly know how to fill** *(3)* the sheet. Today, he had a **stressful day and has already worked 9 hours** *(4)* because the team assumes that the project is **about 2 weeks behind schedule** *(5)*. In the evening, he decides to update the status tracking sheet the day after.

Based on your experience as a project team member, do you understand Bob's decision to update the status sheet the next day and therefore one day later than required by the management?

I do understand    ○      ○      ○      ○      ○    I do not understand

How would you assess the realism of the situation described above?

Very realistic    ○      ○      ○      ○      ○    Very unrealistic

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*Figure 2       Exemplary vignette combining five factors potentially influencing congruence*

Taking these exemplary five vignette factors results in a full factorial combination (vignette population) of 108 ($2\times3\times2\times3\times3$). Because the number of total combinations is usually too large for one survey respondent, the vignettes are typically distributed to a pool of respondents. This can be done in various ways. Often, randomly selected subsets of vignettes are presented to the respondents. The factorial design allows for multiple levels of relevant dimensions and therefore introduces more realistic complexity compared to other survey methods (Lyons, 2008). Moreover, as the vignette dimensions are almost orthogonal, the problem of collinearity, as faced by traditional surveys, can be eliminated (Rossi and Anderson, 1982).

Over the next weeks, a qualitative exploratory phase built on expert interviews will be initiated. Its aim is to identify factors that should be included in the vignettes. Moreover, this phase will help to further sharpen the design of the vignettes and to potentially eliminate less meaningful factor combinations. Once the potentially relevant factors are identified and defined, participants for the vignette

study will be recruited online via the crowdsourcing platform Amazon Mechanical Turk *(www.mturk.com)*. Recruitment from online labor and crowdsourcing platforms by social scientists is increasingly popular but still has its skeptics (Paolacci et al., 2010). However, recent findings show that the quality of data gained on Amazon Mechanical Turk is as reliable as traditionally gained data (e.g. Buhrmester et al., 2011; Paolacci et al., 2010; Sorokin and Forsyth, 2008). According to the Amazon Website (requester.mturk.com/tour), there are more than 500,000 workers from 190 countries available (March 2018). Several filtering questions will be set to ensure that only appropriate participants get involved. The target group will consist of people who were recently part of an IS-related project team. Also, later in the survey, when the vignettes are presented, additional filter questions will ensure that the participants fully read and understand the illustrated situations.

The extensive data matrix resulting from a vignette study allows for a range of statistical analyses. Aim of the analysis is to find the factors relevant for the participants' judgement of the vignettes. To consider sociodemographic differences of the respondents and due to the fact that each respondent assesses a set of vignettes, block effects must be considered when analyzing the data. In literature, a gradual model design is recommended for reconstructing the valuation model. This means that an empty model is step-by-step complemented with the factors included in the vignettes to explain the judgements of the respondents. Subsequently, the fitting model is further extended by including sociodemographic data (Atzmüller and Steiner, 2017; Steiner and Atzmüller, 2006).

# 4 Anticipated Results

The aim of the ongoing research is to investigate the effects of congruence regarding IS project control on the controllees' willingness to comply with given control mechanisms. The underlying assumption is that a project team's higher compliance with controls increases efficiency and effectiveness of control and thus leads to higher IS project success. A controllee's level of congruence with control mechanisms is expected to mainly depend on the following two aspects: (1) the same understanding of controller and controllee regarding the contents of the control, (2) the controllee's perceived appropriateness of the control. This perception is determined by the intrusiveness and the frequency of a control mechanism. Also, other environmental factors might influence the perceived appropriateness of a control, for instance the current level of individual stress or the punctuality of the project.

Due to the early stage of the research at hand, we cannot make predictions about the outcome. However, after reviewing existing literature and taking professional experience in the field of internal control systems and IS-related project work into consideration, the following findings are conceivable:

- A controllee's weak contentwise understanding of an IS project control mechanism leads to an unconsciously induced control inefficiency. So far, research has focused on control selection and project control portfolio creation (Wiener et al., 2016), neglecting the importance of adequate communication to the controllees.

- The controllees' perceived appropriateness of a control mechanism has a significant influence on its effectiveness and efficiency. A project manager implementing control will perceive it as appropriate. However, the perception of controllees regarding appropriateness might be diverging, which could lead to noncompliant behavior and intentionally caused malfunction of control mechanisms.

- Environmental factors within an IS project setting (e.g. project schedule, budget, complexity) as well as personal factors (e. g. age, project work experience) influence the behavior of controllees regarding control execution and willingness to comply with control mechanisms. Taking this aspect more into account could help increase IS project control efficiency and results might serve as a first step to develop more responsive or adaptive IS project control portfolios.

Overall, findings of the ongoing research will help to better understand the importance of congruence between controller and controllee for IS project control efficiency and effectiveness. The novel research focus on congruence combined with the research methodology of applying vignette studies might come up with contributions relevant both for researchers and practitioners.

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