

Servant leadership and its effects on IT project success

Mark Harwardt^{a*}

^a*Hochschule für angewandtes Management, Germany*

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ABSTRACT

Servant Leadership is well known as an employee-oriented leadership style which is used by several major corporations. This work investigates the effects that Servant Leadership may have on the success of Information Technology (IT) projects. To estimate these effects via structural equation modelling (SEM) this study is based on already established models: the model of Servant Leadership developed by Van Dierendonck and Nuijten and the model of IT project success developed by Harwardt. Three of the Servant Leadership dimensions have positive impact on the success dimensions IT project. The Servant Leadership Dimension Accountability has a positive impact on the dimensions Project management success, Perception success and Result success. Authenticity has a positive impact on Project management success and Result success, whereas Forgiveness affects only Result success.

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1. Introduction

Projects, as a form of cooperation, have established over the past years and their significance within companies has steadily increased (Jessen, 2002). Due to the great operational and strategical relevance of IT within companies, this applies especially for IT projects (Schwalbe, 2013). The large number of studies dealing with the effect of leadership on the performance of teams or the effect of leadership on project success is thus not astonishing. Nevertheless, these studies are often limited to the project manager's leadership within the team. The effect of management leadership is not taken into consideration (Clarke, 2012). The type of leadership most focused on within the course of empirical studies analyzing the effect of leadership on the success of IT projects is Transformational Leadership (Clarke, 2012). Servant Leadership, like Transformational Leadership, is an employee-oriented type of leadership (Giampetro-Meyer et al., 1998; Hale and Fields, 20017; Irving and Longbotham, 2007) that has by now gained currency and is applied in large companies like Starbucks, Vanguard Investment Group, Southwest Airline and ID Industries (Bass & Bass, 2008; Parris & Peachey, 2013; Spears, 1995). Despite its large dissemination it can be stated that only a few empirical studies have been conducted about Servant Leadership. The focus was on the devel-

* Corresponding author.

E-mail address: mark.harwardt@fham.de (M. Harwardt)

opment of constructs and measurement models (Parris & Peachey, 2013). Profound empirical research is thus missing and needed (Amin & Kamal, 2016; Bass, B., 2000; Bass & Bass, 2008; Parris & Peachey, 2013).

Regarding the effects accredited to Servant Leadership it is surprising that this did not happen yet. In the following some of these effects are listed exemplarily:

- Servant Leadership establishes a strong relation between a servant leader and the followers; whereby a servant leader is someone who applies Servant Leadership as type of leadership. The application of Servant Leadership generates "*employees' extra effort, employees' satisfaction, and perceptions of organizational effectiveness*" (Barbuto & Wheeler, 2006, S. 322).
- Trusting the servant leader and the servant-led organization creates an environment that can improve the cooperation in team (Garber et al., 2009; Irving and Longbotham, 2007).
- Servant Leadership can increase the employees' efficiency (Irving and Longbotham, 2007; Mayer et al., 2008; McCuddy & Cavin, 2008; Parris & Peachey, 2013)
- Servant Leadership can make companies profitable (Melrose, 1998).

This research aims at closing the gap in literature and conducting an empirical study on the effect of Servant Leadership. Therefore, the effect of Servant Leadership on the success of IT projects shall be presented in the following.

2. Theoretical embedding

2.1 Servant Leadership

In 1970, Robert K. Greenleaf published the essay *The Servant as Leader*. According to him, he got the idea that a true leader is, in fact, a servant after reading Hermann Hesses *Journey to the East*. In this novel the alleged servant Leo turns out to be the true leader of a group the narrator heads to the Orient with (Hesse, 2003). In his essay Greenleaf states that a leader consciously chooses to serve and gives priority to the needs of those led: "*It begins with the natural feeling one wants to serve, to serve first. Then conscious choice brings one to aspire to lead. That person is sharply different from one who is leader first... The difference manifests itself in the care taken by the servant-first to make sure that other people's highest priority needs are being served. The best test, and difficult to administer, is this: Do those served grow as persons? Do they, while being served, become healthier, wiser, freer, more autonomous, more likely themselves to become servants? And, what is the effect on the least privileged in society? Will they benefit or at least not be further deprived?*" (Greenleaf, 1970, S.7). By focusing on the led they shall grow as humans and employees and pay back the trust put in them with increased performance and creativity (Greenleaf, 1970).

Greenleaf (1970) himself describes his work as not being based on logic. His ideas and theories on Servant Leadership are thus not a result of empirically designed studies but are rather based on his own experiences and reflections (Greenleaf, 1970; Van Dierendonck, 2011). Greenleaf (1970) did not give an exact definition of Servant Leadership in his work, but rather describes the behavior characterizing a Servant Leader as well as its possible influence on the followers (Smith et al., 2004). Russel and Stone (2002) comment on this: „*Unfortunately, the literature regarding servant leadership is rather indeterminate, somewhat ambiguous, and mostly anecdotal*” (Russel and Stone, 2002, p. 145). It is thus not astonishing that most researchers concerned with Servant Leadership create their own models and definitions for their research (Van Dierendonck, 2011).

Except for the quote from Greenleaf mentioned earlier in this paragraph, the definitions from Spears (1995) and Laub (1999) are most often referred to in the course of studies on Servant Leadership (Parris and Peachey, 2013). Spears was a former executive director of the Greenleaf Center for Servant Leadership and thus highly qualified to phrase ideas on Servant Leadership (Van Dierendonck, 2011). At that he developed the image of a Servant Leader having ten characteristics:

Listening, Empathy, Healing, Awareness, Persuasion, Conceptualization, Foresight, Stewardship, Commitment to the growth of people and Constitution of a community (Spears, 1995; Spears, 2004). Laub (1999), instead, defined a Servant Leader as somebody who appreciates people, helps people develop, builds a community, shows authenticity, provides leadership and, at the same time, shares leadership. Based on this definition Laub (1999) developed a first corresponding measurement model of Servant Leadership.

In his literature review Van Dierendonck (2011) criticizes the legacy of Greenleaf (1970) as unqualified for a definition of Servant Leadership. He also criticizes the work of Spears (1995; 2004) and Laub (1999): Referring to Laub (1999), he criticizes that the multidimensionality that labels Servant Leadership gets lost in his approach (Van Dierendonck, 2011). Spears (1995; 2004), on the other hand, had never refined his ideas to a tangible model, so that his ten characteristics had not been adequately operationalized (Van Dierendonck, 2011). Therefore, based on a comprehensive review of the existing literature on Servant Leadership and on interviews with Servant Leaders, Van Dierendonck and Nuijten (2011) developed a model of Servant Leadership that was subsequently operationalized and empirically tested. The final model by Van Dierendonck and Nuijten (2011) consists of eight dimensions:

- *Empowerment*¹ describes the ability of a Servant Leader to empower people to do their work and evolve. The Servant Leader believes in the value of every single person.
- The dimension *Accountability* means that the followers are accountable for all achievements they can control themselves. Therefore, the followers need to know what is expected from them and the Servant Leader has to confer to them the responsibility for their tasks.
- *Standing back* signifies the ability of a Servant Leader to assign highest priority to the followers' interests and to grant them both the support needed and the appreciation of their work. The Servant Leader takes a back seat.
- *Humility* comprises the characteristic of Servant Leader to regard his own talents and abilities from an appropriate perspective and thus to admit that he, too, might make mistakes. A Servant Leader is aware of his own limits and weaknesses.
- The dimension *Authenticity* represents that the Servant Leader always presents himself consistently to his thoughts and feelings. The point here is to always express oneself in a professional environment.
- *Courage* refers to the ability of taking risks and trying new solutions. A Servant Leader hence questions even conventional procedure models within the organization.
- *Forgiveness* characterizes the extent to which a Servant Leader can forgive perceived mistakes and not pursue or transfer them to other situations. By this, a Servant Leader is enabled to generate an atmosphere of trust.
- *Stewardship* describes the ability of a Servant Leader to assume responsibility for the organization and to focus on serving, so that control and self-interest fade into the background. Servant Leaders are supposed to be role models, so that others may follow the lead.

Servant Leadership is associated with a multitude of impacts and positive effects that are listed exemplarily in Table 1. The essential summary is that the impacts of Servant Leadership, e.g. employee satisfaction, increased efficiency or commitment to the organization, result from the strong

¹ For the purpose of better differentiation the dimensions of Servant Leadership and the success dimensions and success criteria of IT projects are italicized in the following. This does not apply for tables and figures.

focus on the employee and his needs as well as from the demand of a steady development of the followers.

Table 1

Effects of Servant Leadership

Effects of Servant Leadership	Sources
Servant Leadership takes leader and follower to a higher level of motivation and morality.	Andersen, 2009; Hamilton, 2008
Servant Leadership increases employee satisfaction and thus reduces employee turnover.	Babakus et al., 2011
Servant Leadership creates a healthier environment in the organization for the followers.	Barbuto & Wheeler, 2006
Servant Leadership allows strong and serving relationships between Servant Leader and followers, thus generating employee satisfaction, enhanced perception of the organization's efficiency and additional deployment of staff.	Barbuto & Wheeler, 2006
Trusting the Servant Leader and the servant-led organization creates an environment that can improve the cooperation in team.	Garber et al., 2009; Irving & Longbotham, 2007
The efficiency of employees and teams can be increased by Servant Leadership.	Irving & Longbotham, 2007; Mayer et al., 2008; McCuddy et al., 2008; Parris & Peachey, 2013; Taylor et al., 2007
Servant Leadership improves the individual performance of the employees.	Harwiki, 2013; Jarmillo et al., 2009; Liden et al., 2014
Servant Leadership can render organizations more productive and profitable.	Joseph and Winston, 2005; Melrose, 1998
Servant Leadership creates a positive working atmosphere, which is correlated with the commitment to the organization. This, in turn, has an impact on the employees' satisfaction.	Cerit, 2009; Cerit, 2010; Chung et al., 2010; Hale & Fields, 2007; Mayer et al., 2008; Neubert et al., 2008
The orientation towards growth and success of the employees is correlated positively to the commitment to the organization.	Liden et al., 2008
A servant-led environment generates the preconditions for justice and fair treatment, which are again linked positively to equality.	Chung et al., 2010; Ehrhart, 2004
Equality, rendered by Servant Leadership, promotes trust in the Servant Leader and the organization.	Joseph & Winston, 2005; Sendjaya & Sarros, 2002
A positive correlation exists between Servant Leadership and the efficiency of a leader.	Hale & fields, 2007; Hu & Bentler, 1998; Irving & Longbotham, 2007; Neubert et al., 2008
Servant Leadership promotes and enables a culture of helping.	Ehrhart, 2004; Garber et al., 2009; Hu and Liden, 2011; Walumbwa et al., 2010
The perception of Servant Leadership is positively correlated to the trust in leaders, in particular by the communicative and supportive style of the management.	Joseph and Winston, 2005
A positive correlation could be determined between Servant Leadership and helping as well as creative behavior, which is supported by the promotion of the employees.	Neubert et al., 2008
Servant Leadership has a positive effect on the performance of an organization.	Choudhary et al., 2013; Huang et al., 2016

With Servant Leadership being an employee-oriented leadership style, it is often compared to Transformational Leadership (Bass, 2000; Hamilton, 2008; Van Dierendonck, 2011). Even though both leadership styles can be regarded as transformational (Farling et al., 1999; Hamilton, 2008; Page and Wong, 2000), there is one major difference: Transformational Leadership feels mainly obliged to the organization and thus tries to bring the followers' goals in line with the goals of the organization (Parolini et al., 2009; Stone et al., 2004). Therefore, the growth of the employees only happens if it serves the organization's goals (Van Dierendonck, 2011). Servant Leadership, in contrast, is dedicated entirely to the needs of the individuals (Parolini et al., 2009; Stone et al., 2004) so that the organization's goals are sometimes actually deduced from the goals of the followers (Andersen, 2009). As a result of the comprehensive conceptual work and the empirical studies to prove the reliability and validity of the developed measurement model based on it, the further examination refers to the model developed by Van Dierendonck and Nuijten (2011).

2.2 Models of IT project success

Research in the field IT project success created a vast variety of models designed to register it and make it measurable (Harwardt, 2018). Even though different perspectives of IT project success are meanwhile taken into consideration, there is yet, despite corresponding demands, no model of IT project success that exclusively reflects the management's perspective of IT project success (Davis, 2014; Ika, 2009). Therefore, Harwardt, as a result of a qualitatively designed study, developed a model of IT project success that displays the management's perspective of the success of IT projects

and thus closes the described gap (Harwardt; 2016, 2018). His latest model consisted of three success dimensions. The dimension *Project management success* includes everything related to the planning and execution of the IT project (e.g. adherence to schedule, budget and scope). *Perception success* rates the success of a project from the perspective of clients, end users and team members (e.g. satisfaction of end users). *Result success* assesses the success of the IT project by financial benefits (e.g. contribution to operating income) and strategical aspects (e.g. generation of strategical benefits) (Harwardt, 2018). In the following, this study refers to this model developed by Harwardt (2018), since its reliability and validity have already been demonstrated. Apart from that, it is a theoretically profound model based on findings derived from the analysis of interviews and written surveys of management members (Harwardt, 2016). Additionally, it can be stated that this part of the work investigates the effect of Servant Leadership on IT project success when being applied by management. Therefore, it seems obvious to examine how the application of Servant Leadership by management affects the success dimensions that were declared relevant by the management itself. This increases the practical relevance of this study for the management.

2.3 Objectives of research

This chapter tries to close the aforementioned gaps in literature. Therefore, the effect of leadership by management on the success of IT projects is being examined; this has not been undertaken so far (Clarke, 2012). Furthermore, the demand for further empirical research regarding Servant Leadership is supported (Parris & Peachey, 2013). Thereby, this research clearly differs from similar works which are focused exclusively on the application of Servant Leadership by the project manager (Gwaya et al., 2014; Thompson, 2010) or define project success by the behavior of the employees (Krog & Govender, 2015). In the course of this research a causal relation is assumed between the application of Servant Leadership by management and the success of an IT project. A causal relation is given if changes in an independent variable lead to changes in a dependent variable. Additionally, the changes in the independent variable have to temporally precede the changes in the dependent variable, and the independent variable is the only logical explanation for the observed changes in the dependent variable (Cook & Campbell, 1979; Kenny, 1979). Since it is hardly possible to determine and control all cause variables, causality is already being assumed if the change in one variable is being caused by changing another variable (Blalock, 1985; Weiber & Mühlhaus, 2014).

With leadership research, it is by now established to assume an impact of leadership, with occasional consideration of mediating variables or moderating variables on the individual performance of employees (House and Dessler, 1974; Martin et al., 2013; Miao et al., 2014; Mulki et al., 2015; Steward-Banks et al., 2015), the performance of a team (Amin and Kamal, 2016; Owens and Hekman, 2016; Schaubroeck et al., 2012), project success (Aga et al., 2016; Ayub et al., 2015; Kaminsky, 2012), or on the performance of an organization as a whole (Samad, 2012). As shown in Table 1, the field of Servant Leadership research also identifies and investigates effects of Servant Leadership on individual level (Harwiki, 2013; Jaramillo et al., 2009; Liden et al., 2008), on team level (Irving and Longbotham, 2007; Liden et al., 2008), on project level (Gwaya et al., 2014; Thompson, 2010) and on organizational level (Choudhary et al., 2013; Huang et al., 2016). Due to this broad acceptance of causality in leadership research, especially regarding leadership and team performance or leadership and project success, a causality between the application of Servant Leadership and the success of an IT project can be reasonably assumed.

In order to investigate the impact of Servant Leadership on IT project success, this research attends to the following question: Which effects do the different dimensions of Servant Leadership by Van Dierendonck and Nuijten (2011) have on the success dimensions of IT project success by Harwardt (2018), if Servant Leadership is applied by management in a project environment?

Besides the already presented theoretical relevance this work is highly significant for practice as well. This study shall hence show to what extent the behavior of management influences the success

of an IT project. In this context, the model by Harwardt (2018) is particularly supportive as it captures those success dimensions which are regarded as relevant especially by management.

3. Methodology

3.1. Research approach

This research examines the impact of the dimensions of Servant Leadership on the success dimensions of an IT project by Harwardt (2018). To examine these impacts of latent variables structural equation modelling (SEM) is a widely recognized method. In order to estimate the effects within a theory-based model with SEM, one can use a variance- or a covariance-based approach (Weiber & Mühlhaus, 2014). This study focused on SEM with covariance analysis.

Before one can estimate the effects of latent variables, also known as factors or constructs, with SEM, measurement models of the latent variables have to be developed. A measurement model consists of observable manifestation of a factor which are often called items (Bollen, 2002; Weiber & Mühlhaus, 2014). After identifying reasonable measurement models a questionnaire was developed to gather the data required to estimate the effects via SEM. To gather the required data the survey platform SoSci Survey² was used. The survey was exclusively conducted online because of the assumption that the target group of the study has a high online affinity due to their job.

Subsequently the data of the participants was downloaded from the platform and the returns were evaluated by the statistical software environment R and the additional package Lavaan³ for structural equation modeling with the help of the Statistical Advisory Center of TU Dortmund. Within the scope of a confirmatory factor analysis the model quality was reviewed first; subsequently the impacts of the dimensions of Servant Leadership on the dimensions of IT project success by Harwardt (2018) were examined.

3.2. Measurement model

The model of Servant Leadership developed by Van Dierendonck and Nuijten consists of eight dimensions that comprise the skills and characteristics of a Servant Leader: *Empowerment, Standing back, Accountability, Forgiveness, Courage, Authenticity, Humility and Stewardship* (Van Dierendonck & Nuijten, 2011). These dimensions were assigned 99 items, which were reduced to 30 items in the course of research. Due to the good values of relevant quality criteria like Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis-Index, Standardized Root Mean Square Residual (SRMR) or Comparative Fit Index (see Table 2) a high quality of the model can be assumed. Values higher than 0.7 in determining Cronbach's Alpha for the individual dimensions of Servant Leadership prove a high internal consistency of the measurement model (Nunnally and Bernstein, 1994). The validity of the model was proven in the context of studies as well (Van Dierendonck & Nuijten, 2011). The dimensions and their operationalization of the model of Servant Leadership by Van Dierendonck and Nuijten (2011) were thus included in the study on the impact of Servant Leadership on the success of IT projects (see appendix A).

The updated model by Harwardt (2018) achieves good values for the determined quality criteria as well (see Table 2), so that here, too, a high model quality of IT project success from a management perspective can be assumed. Moreover, the values of Cronbach's Alpha for the individual success criteria and success dimensions are higher than 0.7, which proves a high internal consistency of the measurement model (Nunnally and Bernstein, 1994). Since Harwardt (2018) was able to demonstrate in his work not only the reliability but also the validity of his measurement model, the success

² see also www.sosicurvey.de, accessed 08-18-2018

³ see also www.cran.r-project.org, accessed 08-18-2018

dimensions and their corresponding operationalization were taken into account during further research (see appendix B).

Table 2
Quality criteria of the models

Definition	Abbreviation	Model Servant Leadership	Model Harwardt
Chi-Square test statistic	χ^2	623.500	982.867
Degrees of freedom	df	377	381
Ratio χ^2/df	-	1.654	2.580
Root Mean Square Error of Approximation	RMSEA	0.050	0.053
Tucker-Lewis Index	TLI	0.920	0.947
Root Mean Square Residual	RMR	Not indicated	0.041
Standardized Root Mean Square Residual	SRMR	0.050	0.036
Comparative Fit Index	CFI	0.930	0.947

Sources: Harwardt (2018); Van Dierendonck and Nuijten (2011)

3.2. Sampling

The target group of this survey were employees from the immediate environment of IT projects, who disposed of knowledge of both the internal view on a project and the cooperation in project as well as knowledge of the external view of the organization, the clients and the users. Additionally, the respondents needed to be capable of rating their supervising manager regarding the application of Servant Leadership dimensions. In order to prevent a self-evaluation of management and an overemphasis of individual skills, it was sought to enlist active IT project managers, IT project managers and ScrumMasters for participation in the survey. To ensure this, a corresponding control question was integrated into the questionnaire

Sampling was conducted in three steps. First, the personal network of the author was used for recruiting participants. Everybody who joined this study was also asked for other possible participants. Second, the questionnaire was circulated via XING⁴, a social network for professionals. Third, regional chapters of the Project Management Institute (PMI)⁵ in Germany were also involved in this study.

This sampling strategy reaches out to professionals in Germany, Austria and Switzerland. Therefore, the questionnaire had to be in the German language which made it necessary to translate the items of the Servant Leadership questionnaire from English into German. To make sure that the translations are accurate and correct native speakers of both languages were consulted.

3.4 Reliability of the measurement model

Before one can start analyzing the effects the reliability and the validity of the model need to be checked. After starting to examine the reliability with a confirmatory factor analysis some problems occur.

1. The indicator reliability that determines the share of an item's variance, which is explained by the corresponding construct, was below the required threshold value of 0.4 (Bagozzi & Baumgartner, 1994) for some of the items.
2. The determination of Cronbach's Alpha, which rates the internal consistency of the measurement models on construction level, also gives hints to optimization possibilities. The factor *Stewardship* did not exceed the threshold value of 0.7 (Nunnally and Bernstein, 1994). The internal consistency of the factors *Empowerment*, *Standing back*, *Authenticity* and *Forgiveness* may be enhanced by omitting items.

⁴ see also www.xing.de, accessed 08-18-2018

⁵ see also www.pmi.org, accessed 08-18-2018

3. The average extracted variance rates the degree of variance of all items of a factor, that is explained by the factor itself. Here, they should not be lower than a threshold value of 0.5 (Fornell & Larcker, 1981), which applies only for *Stewardship*.

Therefore, optimizations were undertaken by omitting those items that stood out due to deficient values for indicator reliability or an optimization of Cronbach's Alpha. As Table 4 shows all the determined quality criteria, with exception of *Stewardship* are higher than the recommended threshold values. Only Cronbach's Alpha of 0.686 for *Stewardship* is below the threshold value of 0.7. Because of the short underrun and the fact that *Stewardship* fulfills all other quality criteria, the fact remains in the model.

Table 4
Value criteria on construction level of final effect model

Factor	Item	Indicator reliability	Cronbach's Alpha	Average extracted variance	Factor reliability	Fornell/Larcker-Criterion
Empowerment	SL01_01	0.626	0.923	0.674	0.925	Fulfilled
	SL01_02	0.734				
	SL01_03	0.797				
	SL01_04	0.667				
	SL01_12	0.587				
	SL01_27	0.630				
Standing back	SL01_05	0.948	0.890	0.817	0.899	Fulfilled
	SL01_13	0.686				
Stewardship	SL01_11	0.439	0.686	0.537	0.697	Not fulfilled
	SL01_19	0.635				
Humility	SL01_10	0.804	0.913	0.681	0.914	Not fulfilled
	SL01_18	0.518				
	SL01_25	0.535				
	SL01_29	0.787				
	SL01_30	0.762				
Authenticity	SL01_09	0.572	0.829	0.622	0.831	Fulfilled
	SL01_24	0.577				
Forgiveness	SL01_28	0.717	0.805	0.698	0.820	Fulfilled
	SL01_07	0.877				
	SL01_23	0.518				
Accountability	SL01_06	0.707	0.907	0.769	0.909	Fulfilled
	SL01_14	0.824				
	SL01_22	0.775				
Courage	SL01_08	0.453	0.741	0.614	0.757	Fulfilled
	SL01_16	0.775				
Project management success	IT01_31	0.777	0.921	0.805	0.925	Fulfilled
	IT01_33	0.895				
	IT01_35	0.744				
Perception success	IT01_34	0.635	0.865	0.776	0.873	Fulfilled
	IT01_36	0.918				
Result success	IT01_32	0.973	0.850	0.770	0.868	Fulfilled
	IT01_38	0.567				

3.5. Validity and measurement model

Since the reliability of the measurement model could be verified, the next step is to examine the validity of the model. Content validity is given if the indicators semantically display their corresponding factor (Weiber & Mühlhaus, 2014). This can be assumed, since, on the one hand, the comprehensive model is composed of two already validated models, and since, on the other hand, the measurement model was, in turn, validated by different researchers (Cronbach and Meehl, 1955). The additional high correlations of each factor's items, as to be looked up in appendix C, also argue for a high content validity (Hildebrandt, 1984). Construct validity is given, if the measurement of a factor “is not falsified by other constructs or systematical errors” (Weiber and Mühlhaus, 2014, p. 159). It is subsequently deduced by the nomological validity, the convergence valid-

ity and the discriminant validity. Nomological validity is given, if the correlations between the constructs can be presented on a theoretically profound basis. In addition to a corresponding deduction of the model, the examination can be performed based on the model quality and the determined impacts (Bagozzi, 1979; Hildebrandt, 1984). As both the model quality (see Table 6) and the determined impacts (see Table 10) support the model, nomological validity can be assumed.

Convergence validity exists, if the measurement results of a factor are consistent when two different methods are applied (Fornell & Larcker, 1981; Weiber & Mühlhaus, 2014). With this often being rather difficult in practice, a different procedure has established itself (Weiber & Mühlhaus, 2014): Convergence validity can be assumed, if the average extracted variance of each factor is higher than 0.5 (Fornell & Larcker, 1981). According to Table 4, this applies for each individual factor.

Discriminant validity is given, if the measurements of different factors differ significantly (Fornell & Larcker, 1981; Weiber & Mühlhaus, 2014). This can be examined by the Fornell/Larcker-Criterion that relates the average extracted variance of a factor to its squared correlations with other factors. The average extracted variance should thereby always be higher than the squared correlations (Fornell & Larcker, 1981). The only factors that do not fulfill this criterion are *Stewardship* and *Humility*. In order to prove the discriminant validity, it is additionally being examined how the correlations of a factor's items among themselves are related in comparison to the correlations of other factors. If at least half of all possible correlations of other factors' items are smaller than the correlations of the items among themselves, discriminant validity can be assumed (Campbell & Fiske, 1959; Robey et al., 1993). Table 5 shows how large half of the possible correlations with other factors' items are and how many of the possible correlations are smaller than the correlations of items within a factor. As to be seen, at least 90% of the possible correlations are smaller than the correlations within the factors, so that discriminant validity can be assumed. Since by now both content validity as well as construct validity were proved, a reliable and valid measurement model is present in total.

Table 5
Examination of correlations of items of impact model

Factor	Number Items	Half of possible correlations to other factors' items	Smaller than correlations within the factor	Percentage
Empowerment	6	78	143	91.667%
Standing back	2	30	60	100.000%
Stewardship	2	30	54	90.000%
Humility	5	68	126	92.647%
Authenticity	3	44	86	97.727%
Forgiveness	2	30	60	100.000%
Accountability	3	44	87	98.864%
Courage	2	30	60	100.000%
Project management success	3	44	87	98.864%
Perception success	2	30	60	100.000%
Result success	2	30	60	100.000%

3.6. Fit model

The determined values for the quality criteria of the model show that the model already fulfills most of the required criteria (see Table 6). The Root Mean Square Error of Estimation verifies if the current model approximates the present data. Here, a threshold value of 0.08 and smaller should be achieved, while zero reflects a complete approximation to reality (Brown & Cudeck, 1993). With a determined value of 0.031 this criterion is appropriately fulfilled. The Root Mean Square Residual examines the discrepancies between the model-based and the empirical covariance matrix (Steiger, 1990). The scale has no upper limits, with small values pointing to slight deviations between the two (Jöreskog & Sörbom, 1983). The value of 0.028 that was determined here shows slight deviations and hence a high approximation of the model to reality. The Standardized Root Mean Square Residual eliminates the problem of the open-ended scale and assumes values between zero and one. A threshold value of 0.08 should not be exceeded here (Hu & Bentler, 1998). The determined value

of 0.033 hence supports the previous findings. The Tucker-Lewis-Index and the Comparative Fit Index are incremental Fit-Indices. They compare the present model with an uncorrelated independence model. Both may assume values between zero and one, with a value close to one pointing to a substantial model (Bentler, 1990; Tucker & Lewis, 1973). While a value of 0.95 and higher is often required as a threshold value for the Tucker-Lewis-Index (Hu & Bentler, 1998), the Comparative Fit Index frequently uses a value of 0.9 and higher (Homburg & Baumgartner, 1995). The threshold value of the Comparative Fit Index is over-run with 0.923, as the threshold value of the Tucker-Lewis-Index is not over-run with 0.914. Since the other quality criteria speak for an overall appropriate model, a good model fit can be assumed.

Table 6
Quality criteria of final comprehensive model

Definition	Abbreviation	Model impacts	Threshold values
Chi-Square test statistic	χ^2	3067.970	-
Degrees of freedom	Df	2004	-
Ratio χ^2 /df	-	1.531	≤ 3
Root Mean Square Error of Approximation	RMSEA	0.031	≤ 0.08
Root Mean Square Residual	RMR	0.028	Small values
Standardized Root Mean Square Residual	SRMR	0.033	≤ 0.08
Tucker-Lewis Index	TLI	0.914	≥ 0.95
Comparative Fit Index	CFI	0.923	≥ 0.9

4. Findings

4.1. Descriptive statistics

The participants of the survey were IT project managers, IT project managers and ScrumMasters who were able to provide an internal and external view on their IT projects.

Table 7
Overview participants

Gender	Male	398	70.1%
	Female	170	29.9%
	Total	568	100.0%
Educational qualification	No graduation	0	0.0%
	General qualification for university entrance	46	8.1%
	Professional education	65	11.4%
	Bachelor (UAS)	82	14.4%
	Bachelor (University)	54	9.5%
	Diploma/master (UAS)	130	22.9%
	Diploma/master/magister (University)	155	27.3%
	Doctor's degree	27	4.8%
	None of the above	9	1.6%
Total	568	100.0%	
Professional experience	≤ 5 years	92	16.2%
	6 to 15 years	246	43.3%
	6 to 25 years	136	23.9%
	26 to 35 years	72	12.7%
	> 35 years	22	3.9%
	Total	568	100.0%
Project experience	≤ 5	85	15.0%
	2 = 6 to 10	130	22.9%
	3 = 11 to 20	160	28.2%
	4 = 21 to 30	87	15.3%
	5 = > 30	106	18.7%
	Total	568	100.0%

As to be seen in Table 7, 568 participants could be enlisted, of whom 170, thus 29.9%, were female. Besides a high number of participants with academic background, it can be registered that 83.8% of the participants disposed of long-term professional experience of six years and more and that 85.0% of the participants had a project experience of six and more projects.

Table 8 provides basic data on the organizations the participants of the survey were employed with. Despite the broad distribution including all professional sectors, it can be registered that the sector of IT and e-commerce is significantly over-represented in comparison to others. This is not very remarkable though, since it was sought to enlist especially those kinds of participants for the survey who are implementing IT projects. Only the sector health and social affairs is slightly under-represented with 3.3%, though this may be due to the peculiarities of this sector.

Table 8

Overview organizations

Sector	Bank and insurance	45	7.9%
	Service	45	7.9%
	Media	31	5.5%
	IT and e-commerce	253	44.5%
	Health and social affairs	19	3.3%
	Trade and distribution	65	11.4%
	Administration and public services	28	4.9%
	Industry	42	7.4%
	Other	40	7.0%
	Total	568	100.0%
Con-tractor	Yes	240	42.3%
	No	328	57.7%
	Total	568	100.0%
Number of employees	< 10 employees	38	6.7%
	10 to 50 employees	77	13.6%
	51 to 250 employees	139	24.5%
	251 to 1000 employees	144	25.4%
	1001 to 10.000 employees	101	17.8%
	> 10.000 employees	69	12.1%
Total	568	100.0%	
Management level	First-line management	169	29.8%
	Middle management	263	46.3%
	Senior management	136	23.9%
	Total	568	100.0%

4.2 Impacts of Servant Leadership on IT project success

Table 10 contains the determined path coefficients and their corresponding p-values for the impact of Servant Leadership on the dimensions of IT project success. With a chosen significance level of 5% it can be registered, that only the Servant Leadership dimensions *Authenticity*, *Accountability* and *Forgiveness* assumed significant impacts since the p-values determined here were smaller than 0.05. Due to the partly very high p-values, other impacts are not considered in the following discussion.

5. Discussion

5.1. Answer to research question

By help of structural equation modeling it could be shown that Servant Leadership, if applied by management, can have a positive impact on the success of IT projects. In tangible terms, the Servant Leadership dimensions *Authenticity*, *Accountability* and *Forgiveness* have a positive impact on the three success dimensions *Project management success*, *Perception success* and *Result success* of an IT project (see Fig. 1).

Table 10
Impact of Servant Leadership on IT project success

Independent variable	Dependent variable	Standardized path coefficient	p-value
Authenticity	Result success	0.206	0.017
	Project management success	0.205	0.023
	Perception success	0.113	0.209
Humility	Perception success	-0.171	0.263
	Result success	-0.158	0.283
	Project management success	-0.127	0.408
Courage	Project management success	0.156	0.138
	Perception success	0.107	0.301
	Result success	-0.016	0.871
Empowerment	Perception success	0.078	0.421
	Project management success	0.061	0.529
	Result success	0.046	0.621
Stewardship	Project management success	-0.127	0.497
	Result success	0.023	0.897
	Perception success	0.004	0.983
Accountability	Project management success	0.152	0.010
	Result success	0.133	0.018
	Perception success	0.123	0.037
Forgiveness	Result success	0.141	0.046
	Project management success	0.080	0.274
	Perception success	0.039	0.596
Standing back	Perception success	0.062	0.364
	Project management success	-0.022	0.748
	Result success	0.000	0.997

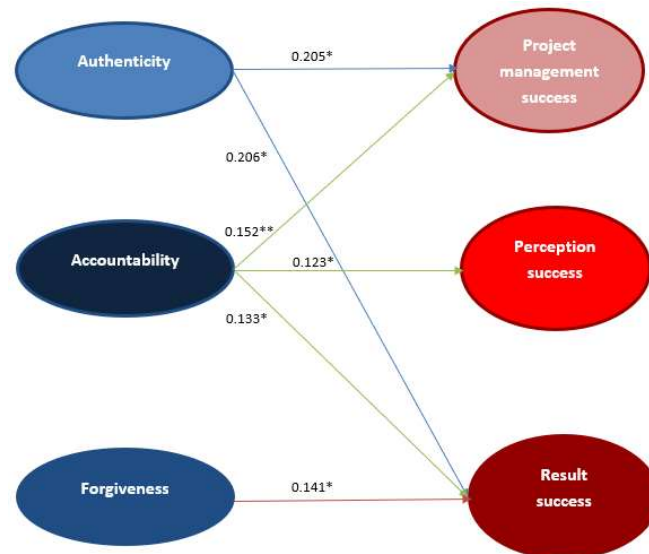


Fig. 1. Impacts of Servant Leadership

(** = very significant with p-value > 0.001 and ≤ 0.01; * = significant with p-value > 0.01 and ≤ 0.05)

Here, *Authenticity* positively affects the dimensions *Project management success* and *Result success*. *Authenticity* describes the ability to have an appearance that is consistent with one's feelings and thoughts (Van Dierendonck and Nuijten, 2011). If leaders are authentic and genuine, then they

are trusted (George et al., 2007). Trust, in turn, has a positive impact on the attitude towards the job, on the performance of a team, on cooperation and on the commitment to the organization (Dirks, 2000; Dirks and Skarlicki, 2009; Jones and George, 1998; Lewicki et al., 2006; Liden et al., 2014; Schaubroeck et al., 2011). These factors eventually contribute to an efficient project implementation and an enhanced project result. The Servant Leadership dimension *Accountability* has a positive impact on the three success dimensions *Project management success*, *Perception success* and *Result success*, if corresponding behavior is lived by management. A leader possessing this characteristic assigns responsibility to the followers, thus rendering them accountable for the results (Konczak et al., 2000). *Accountability* is thereby regarded as an important instrument of positive and effective leadership (Van Dierendonck & Nuijten, 2011), so that positive impacts on the dimensions of IT project success, especially on the team's perception and an efficient project implementation, can be expected. This, again, can lead to an enhanced project result. *Forgiveness* describes the ability to forgive mistakes and to not pursue them any further. By this, a trustworthy environment for the cooperation of leader and followers is generated (Van Dierendonck and Nuijten, 2011). *Forgiveness* has a positive impact on the *Result success*. If leaders allow employees to make mistakes, a trustworthy environment for employees can develop (Ferch, 2005), which has influence on the *Result success* as well (Dirks, 2000; Dirks and Skarlicki, 2009; Jones and George, 1998; Lewicki et al., 2006; Liden et al., 2014).

Although literature shows a positive impact of *Humility*, *Courage*, *Empowerment*, *Standing back* and *Stewardship* on project success (Caldwell et al., 2008; De Cremer, 2006; Grosse, 2007), this study cannot confirm these effects. The reasons for this could be that this study was only conducted in Germany, Austria and Switzerland, so results may differ from studies conducted in other cultural areas.

5.2. Limitations

First, the study is subject to the limitation of having been conducted only locally in German-speaking regions with participants from Germany, Austria and Switzerland. Transferring the results into an international context is hence not immediately possible. Moreover, it has to be stated that neither moderating nor mediating impacts (e.g. trust) were considered in the examined structural equation model. Additionally, there may be other factors influencing the success of an IT project, e.g. the experience of the project manager or the skills of the project team. A common-method bias cannot be fully excluded due to type and structure of the survey (Podsakoff & Organ, 1986).

5.3. Conclusion and recommendations for further research

This paper shows the positive impact of the dimensions of Servant Leadership on the success dimensions of an IT project:

1. *Authenticity* affects *Project management success* and *Result success*;
2. *Accountability* affects *Project management success*, *Perception success* and *Result success*;
3. *Forgiveness* affects *Result success*.

These findings are highly important to the management because now they have a toolbox of how to act and to behave that can lead to successful projects. No significant impacts on the success dimensions of an IT project could be proven for *Humility*, *Courage*, *Empowerment*, *Standing back* and *Stewardship*. This is remarkable, since literature underlines the positive impact of these characteristics (Caldwell et al., 2008; De Cremer, 2006; Grosse, 2007). It is hence interesting to examine in detail why these characteristics of a Servant Leader have no impact on the success dimensions of IT projects. The explanation of the causal relations between the dimensions of Servant Leadership and the success dimensions of an IT project indicates that mediating effects like trust exist, which should be examined more closely. Furthermore, it is possible that moderating variables exist which

influence the strength of the impact of the Servant Leadership's dimensions on the success dimensions of IT project success.

To conclude, a further examination of factors influencing the success of IT projects is necessary. This includes a detailed exploration of the causes of the already identified impacts on IT projects. On the other hand, other potentially influencing factors should be examined. Since this research was only conducted in German-speaking regions, a transfer into an international context is desirable.

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Appendix A – Questionnaire Servant Leadership

The following items were used in the original study conducted by Van Dierendonck and Nuijten (2011). They were also used in the study at hand. The “-“ marks negatively phrased items. The items were rated by the participants with the help of a six-stage Likert scaling. 1 stood for complete refusal of the statement, 6 stood for full approval.

Empowerment

- SL01_1: My manager gives me the information I need to do my work well.
- SL01_2: My manager encourages me to use my talents.
- SL01_3: My manager helps me to further develop myself.
- SL01_4: My manager encourages his/her staff to come up with new ideas.
- SL01_12: My manager gives me the authority to take decisions which make work easier for me.
- SL01_20: My manager enables me to solve problems myself instead of just telling me what to do.
- SL01_27: My manager offers me abundant opportunities to learn new skills.

Standing back

- SL01_5: My manager keeps himself/herself in the background and gives credits to others.
- SL01_13: My manager is not chasing recognition or rewards for the things he/she does for others.
- SL01_21: My manager appears to enjoy his/her colleagues' success more than his/her own.

Accountability

- SL01_6: My manager holds me responsible for the work I carry out.
- SL01_14: I am held accountable for my performance by my manager.
- SL01_22: My manager holds me and my colleagues responsible for the way we handle a job.

Forgiveness

- SL01_7: My manager keeps criticizing people for the mistakes they have made in their work (-).
- SL01_15: My manager maintains a hard attitude towards people who have offended him/her at work (-).
- SL01_23: My manager finds it difficult to forget things that went wrong in the past (-).

Courage

- SL01_8: My manager takes risks even when he/she is not certain of the support from his/her own manager.
- SL01_16: My manager takes risks and does what needs to be done in his/her view.

Authenticity

- SL01_9: My manager is open about his/her limitations and weaknesses.
- SL01_17: My manager is often touched by the things he/she sees happening around him/her.
- SL01_24: My manager is prepared to express his/her feelings even if this might have undesirable consequences.
- SL01_28: My manager shows his/her true feelings to his/her staff.

Humility

- SL01_10: My manager learns from criticism.
- SL01_18: My manager tries to learn from the criticism he/she gets from his/her superior.
- SL01_25: My manager admits his/her mistakes to his/her superior.
- SL01_29: My manager learns from the different views and opinions of others.
- SL01_30: If people express criticism, my manager tries to learn from it.

Stewardship

