

# IT Project Member Turnover and Outsourcing Relationship Success: An Inverted-U Effect

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**Abstract.** The scarcity of skilled information technology (IT) professionals on today's IT labor market translates into a challenge for organizations to obtain the right skillset. These organizations use outsourcing as one approach to ensure access to valuable human capital resources. The vendor-client relationship success thereby depends on the vendor's capability to provide the appropriate IT competencies and applications. Analyzing 8,000 projects for more than 900 customers at a large German IT service provider, this study investigates the effect of turnover rates on the outsourcing relationship. The results suggest that turnover of IT project team members has an inverted U-shaped effect on the revenue the vendor achieves with the customer. Utilizing a human capital lens on turnover in IT outsourcing (ITO), this study highlights that moderate levels of turnover have a positive impact on the outsourcing relationship.

**Keywords:** IT outsourcing, turnover consequences, vendor-client relationship, human capital resources

## 1 Introduction

The information technology (IT) labor market is characterized by rapid technological changes and a growing demand for skilled IT workers [1, 2]. At the same time, advanced technical expertise is scarce and fluctuation among IT professionals is high [1, 3]. In this context, obtaining the required human resources is a challenge for organizations. These organizations use outsourcing as one approach to ensure access to valuable human capital resources [4, 5]. The vendor takes on the responsibility to develop and train IT competencies and to provide the best applications to the client [2]. This allows the client to focus on core business activities and to adapt faster to new technologies and markets [1]. The vendor is seen as strategic partner in delivering the client's IT projects [6].

IT outsourcing success is linked to client's satisfaction with the contract and the development of long-term vendor-client relationships [7]. Turnover can both enhance and harm this relationship. Past findings show that turnover from vendor to client is a vendor-related success factor [7]. While on the short-term the vendor loses an

employee, on the long-term the relationship between vendor and client is strengthened. Another option is turnover to another organization or turn-away from the IT profession. In this case, the vendor replaces the leaving employee and provides appropriate training. The client should not perceive a negative disruption of the workflow as he transferred the human capital responsibility to the vendor [8]. The exchange of team members further enables the infusion of new skills and technologies into the project leading to a positive effect for the client [9]. From this perspective, a turnover rate above zero is desirable. The vendor may struggle to manage turnover and replacement effectively in situations with high turnover rates, when leaving employees may not be replaced on-time or lack experience [10, 11]. This might result in additional efforts and costs for the client, for example, for knowledge transfer or coordination [11].

While much is known about the antecedents to turnover and how turnover evolves in organizations, there is a lack of knowledge about the actual consequences [12]. Particularly, the consequences on long term IT project success are largely unexplored. The objective of this paper is to answer the following research question: *How does project member turnover affect the success of the vendor-client relationship in IT outsourcing?* The research question is answered using a longitudinal ITO dataset of 8,000 projects for more than 900 clients. We analyze the effect of different turnover rates on the success of the outsourcing relationship from the IT vendor's perspective. Results show that turnover has an inverted U-shaped effect on the revenue the vendor achieves with the customer.

## **2 Theoretical Background**

### **2.1 Turnover Theory**

Past research on employee turnover focused primarily on the antecedents to individual voluntary turnover [3, 12]. Major turnover theories like the unfolding model of voluntary turnover contributed to an understanding of how turnover evolves in organizations [13]. Recent studies turn the focus on turnover as a collective construct. Looking at aggregated levels of turnover allows to analyze relationships to variables on a higher than individual level, like productivity or organizational performance [14].

The IT profession constitutes a specific context to study turnover. First, IT professionals differ in mindset from other professions and show high turnover rates [15]. Turnover may actually be accepted as part of the work culture [16]. Second, IT professionals possess a broad range of job opportunities and a highly marketable skillset [17, 18]. Job hopping is recognized as a common job pattern to achieve promotion or salary growth [15]. Third, IT-specific human capital is a major driver for an IT professional's decision to leave or stay [19]. Based on technological change, IT-specific human capital is subject to professional obsolescence [4]. IT professionals must continuously update their skills to retain their market value [20]. Corresponding to this specific IT context, turnover research adapted and extended existing theories to

the IT profession. Testing the unfolding model of voluntary turnover for IT professionals revealed divergent decision paths compared to the original model [21]. For example, a strong awareness of available job alternatives fuels frequent job search behavior and a comparison with the current work situation.

While research examining turnover antecedents presumes that turnover is a problem for organizations, there is a lack of knowledge about the actual consequences [12, 22]. IT turnover is argued to be “particularly disruptive and costly” for organizations [21]. Understanding this turnover-outcome relationship requires to shift the focus on turnover as independent variable. Prior research on consequences of IT turnover is rare. A recent review of the IT literature found merely seven studies on the consequences of turnover [12]. For the former employer, only negative consequences are identified. These can be clustered in three types of consequences (see Table 1). First, turnover increases costs, namely project and compensation costs [11, 15, 23]. Second, turnover affects the remaining employees, for example through a loss in knowledge or motivation [24-26]. Third, turnover is related to project profits [27, 28]. The majority of these studies examines the IT project level. This reflects the project-oriented nature of IT work [29]. All studies assume a negative linear effect of IT turnover.

**Table 1.** Past research on consequences of IT turnover

<i>Consequences</i>	<i>Performance measure</i>	<i>Context</i>	<i>Effect of turnover</i>	<i>Source</i>
Costs	Project costs, project duration	Software development projects	Linear negative	[23]
	Compensation costs	IT professionals	Linear negative	[15]
	Client extra costs	Offshored software projects	Linear negative	[11]
Project team	Knowledge loss	Software development projects	Linear negative	[24]
	Knowledge loss, project success	Information systems development projects	Linear negative	[25]
	Staff motivation, project success	Software development projects	Linear negative	[26]
Profits	Expected profits	Outsourced software development projects	Linear negative	[27]
	Deviation between expected and realized profits	Outsourced software development projects	In-significant	[28]

## 2.2 Human Capital Theory

Human capital theory suggests that turnover can have both negative and positive effects. IT human resources are valuable capital needed for sustainable competitive advantage [4, 19]. Knowledge resources operate on the team level as they depend on

team member interaction and other environmental factors like coordination and team climate [30]. In consequence, turnover influences the in- and outflow of human capital on the team level. To understand consequences of turnover, it is necessary to derive an understanding of IT professionals' specific human capital. IT personnel possesses both firm- and IT-specific human capital [15]. Companies must decide which type of human capital is most valuable for them. On the one hand, a high retention rate assures that knowledge is retained within the company [29]. This may be desirable if a high level of company-specific knowledge is required. On the other hand, a moderate turnover level facilitates continuous knowledge exchange [29]. Turnover provides the chance to revitalize the team by the infusion of new members and ideas as well as the replacement of old skillsets [11, 29]. Workforce mobility is seen as instrument for spreading innovation [9]. Furthermore, turnover bears the opportunity to replace poor performing or conflicting employees [31].

### **2.3 Vendor-Client Relationship in IT Outsourcing**

Outsourcing is a prevalent phenomenon particularly in the IT domain and has reached a certain level of maturity over the past years [5, 32]. Besides cost reduction opportunities, the access to expertise is a major strategic driver for an organization's motivation to outsource [33]. Clients see their relationship as strategic partnership rather than opportunistic [6]. A project may be considered successful if it contributes to sustainable employee training or increased market reputation [8]. Particularly in the IT outsourcing context, a vendor may evaluate project success based on the project's contribution to the establishment of long-term relationships with clients [8]. A successful relationship increases client's satisfaction and increases the chances of a follow-up project for the vendor [5].

Many IT outsourcing projects fail because of an unsuccessful vendor-client relationship [5, 7]. The vendor-client relationship is defined as "an ongoing, long term linkage between an outsourcing vendor and customer arising from a contractual agreement to provide one or more comprehensive IT activities, processes, or services with understanding that the benefits attained by each firm are at least in part dependent on the other" [34]. Several factors drive the success of this relationship. These include characteristics related to the client, the vendor as well as the vendor-client relationship [2]. The client has to enable the vendor by making timely and sustained decisions and by accepting instructions from the vendor [7]. A high relationship quality is inter alia related to strong relational governance, participation, communication, information sharing, and management support [33, 35]. In addition, project member characteristics such as high reliability and technical expertise impact the ITO success [7].

Clients evaluate vendors based on their IT capabilities [36]. Amongst others, the vendor is responsible to provide valuable up-to-date human capital resources needed for competitive advantage [4, 5]. The vendor's capability to manage and train these competencies and to provide the best applications to the client is decisive for the outsourcing success [5]. In this context, project member mobility turns into a risk factor for the service provider as he has to balance potential threats and benefits of

turnover and replacement [8]. In sum, both sides aim to establish and maintain long-term outsourcing relationships. Clients view the IT vendor as a strategic partner to ensure steady access to expertise. The vendor's human resource management capability is a major determinant for the relationship success. Project member turnover is a vendor-related characteristic that impacts the collaboration with the client [11].

### **3 Hypotheses Development**

Human capital resources are intangible team-level constructs [30]. As turnover and replacement translate into an in- and outflow of skills within the team, turnover affects the performance of the entire project. Vendor-client relationships evolve across project boundaries. In consequence, the success of the long-term relationship with the client is crucial for the IT vendor and may displace the short-term project success. Turnover thereby can both enhance and harm the vendor-client relationship. While most past studies on turnover consequences assume a linear negative effect, recent advances in turnover research suggest a different view [37]. Prior studies showed that the relationship between turnover and organizational performance varies across different turnover rates [38]. Thereby, the optimal turnover level differs across organizations implicating that turnover is expected to yield positive outcomes up to a certain threshold [29]. Not before turnover exceeds this threshold, negative consequences arise.

Research shows that employee turnover from vendor to client is a vendor-related success factor [7]. While on the short-term the vendor loses an employee, the long-term vendor-client relationship is strengthened. Other options are turnover to another organization or turn-away from the IT profession. In outsourcing, the client contracts a service provider to get access to valuable human capital resources that are difficult to obtain [4]. As the client transferred the human capital responsibility to the vendor, negative turnover consequences like recruitment and training costs should not be perceivable by the client [8]. Turnover can trigger a positive knowledge exchange [9, 11, 29]. Retaining every employee may be illusive [3, 22, 31]. In this case, a moderate turnover level is supposed to have a positive effect. This view is supported by several studies suggesting that the optimal turnover rate is not zero [29, 39].

However, if turnover exceeds a moderate level, the vendor may fail to manage replacements efficiently and on-time. If multiple team members leave, turnover causes a severe workflow disruption on the project level. Furthermore, there are less team members left who can transfer knowledge to new team members. As human capital is regarded a major success factor, the outflow of a large amount of knowledge results into a negative effect on team performance [10, 24]. New team members lacking training cause additional costs based on increased efforts for knowledge transfer, coordination and control [11]. Thus, the success of the vendor-client relationship is influenced by the turnover rate in the vendor's project team. This results in the following first hypothesis.

*Hypothesis 1: Turnover will have an inverted U-shaped relationship with the revenue the vendor achieves with the customer such that both very low and very high turnover rates weaken the vendor-client relationship success. More specifically, the achieved revenue with the customer will be highest at a moderate turnover level.*

The client-specific knowledge on the vendor side impacts the ability of the vendor to choose and apply appropriate human resource management (HRM) practices. Several previous collaborations with the same customer allow the vendor to accumulate knowledge about the customer's objectives and internal processes [11]. Subsequent projects can be executed more efficiently [28]. Based on prior projects, the vendor can evaluate different project settings and estimate industry requirements more appropriate. Some customers may require a high degree of client-specific knowledge, for example, on unique work procedures or employed software systems [11]. The IT vendor can utilize his knowledge to decide about best practices to handle turnover and replacement.

Long client related work experience allows the vendor to tailor the team-level human capital composition to the specific context of the project. Frequent client projects imply a stronger vendor-client relationship [28]. Other research supports this assumption by proposing that prior knowledge from projects with the same customer benefit the vendor-client relationship as, for example, knowledge transfer costs for the customer are decreased [11]. Relationship quality improves by increased communication and information sharing [33, 35]. Prior projects facilitate factors like continuous information exchange between vendor and client which in turn decrease conflict and coordination efforts and increase satisfaction [11, 34].

Summarizing, the client specific knowledge that the vendor collected during prior projects enables the vendor to tailor HRM practices to the customer. Potential negative turnover consequences can be mitigated. The second hypothesis is stated as follows.

*Hypothesis 2: The number of prior projects will moderate the effect of turnover on the achieved revenue with the customer by influencing the turning point in the inverted U-shaped relationship. Specifically, a higher number of prior projects will weaken the negative effects of turnover.*

## **4 Method**

### **4.1 Data Collection**

The data was collected from a large German IT service provider, ALPHA. The dataset contains detailed information on customers, projects and employees between 1995 and 2014. The data used in this study covers the years 2009 to 2012. For these years complete turnover data is available for 8,290 projects and 934 customers. This includes information about 3,432 IT professionals.

The within-organization setting at ALPHA provides an optimal setting to investigate turnover-outcome relationships as it controls "for unobserved covariates such as company policies, work design, HRM practices, and the like, as opposed to

their between-organization counterparts” [40]. The available data resembles the character of panel data as it includes multiple projects for the same customer. The panel structure allows to observe constructs over time and track changes in a timely order.

## 4.2 Measures

Prior findings suggest that turnover effects do not occur immediate but with a time lag [41]. Turnover was found to have a significant negative effect on customer service score when measured over a period of three months [41]. The impact of monthly turnover, in contrast, was insignificant. In this study, six months are chosen as interval length resulting in eight half-year intervals in our sample. All variables are calculated separately for each interval and aggregated on the customer level.

*Dependent variable.* The *revenue the vendor achieved with the customer* is chosen as dependent variable to measure the relationship success from the IT vendor’s perspective. Vendor-client relationships evolve over time and across project boundaries. Establishing long-term relationships is crucial for the vendor as the customer is also the source of future projects [2, 6]. The financial performance with the customer is one major determinant for the partnership success for the vendor [42]. IT outsourcing remains a cost-driven decision [33]. In consequence, financial metrics are particularly suitable for investigating the long-term and, hence, strategic impact of IT outsourcing. Prior research shows that these measures steer ITO partnerships [33]. The achieved revenue with the customer is chosen as proxy for the financial performance with the client and measured by the cumulated revenues in the respective interval.

*Independent variable.* Turnover is commonly analyzed in terms of a *turnover rate* [11, 23, 25]. The turnover rate displays the proportion of leaving employees on an aggregated level. The team size represents the total number of ALPHA employees working with the customer. Absolute turnover is measured in terms of the number of employees who work with the customer and quit ALPHA during the respective interval. Dividing the absolute turnover by the team size results in the turnover rate.

*Control variables.* To ensure that the achieved revenue with the customer is not primarily influenced by other factors, several control variables are included. The *interval* is included as a factor variable to filter out fixed effects of time. This includes, for example, internal changes such as learning effects as well as external market conditions such as inflation [41]. The vendor’s objective is to develop long-term relationships with the client. To acknowledge that the current client relationship influences the achieved revenue, the as-is relationship with the customer is included as control variable. This is done by classifying clients into segments based on the number of running projects in the respective interval. The *client segment* is included as factor variable. IT vendors conduct projects in different *client industries*. Between these industries market conditions and competition alter as well as the expertise of the IT vendor [43]. The industry is included as a factor variable. ALPHA distinguishes between time & material and fixed price contracts. Past research showed that different *contract types* yield varying financial outcomes [27, 28]. To incorporate these

differences, the contract type is included as a binary variable. As mentioned, all variables are aggregated on the customer level to capture that outsourcing relationships evolve across single projects.

*Moderator.* Different projects allow the vendor to collect knowledge about the client's objectives and processes. A high number of prior collaborations increases transaction costs to competing IT vendors and facilitates information sharing between vendor and client [28, 34]. The *number of prior projects* is measured in terms of the number of collaborations with the customer in the preceding five years. The selected time period ensures that there is no bias towards the first and last observed interval.

**Table 2.** Descriptive statistics and correlations for numerical variables

Variable	Descriptive statistics				Correlations		
	Unit	Min	Mean	Max	1	2	3
1. Revenue with the customer	€ revenue	51	264,383	12,009,137	1		
2. Number of prior projects	# projects	1	4.729	491	.58 ***	1	
3. Turnover rate	% team size	0	0.03902	1	0	.01	1

Signif. codes: '\*\*\*' <0.001, '\*\*' <0.01, '\*' <0.05, '.' <0.1

The descriptive statistics and correlations for the numerical variables are displayed in Table 2. To test for multicollinearity, the variance inflation factor is calculated. In all models the VIF scores are below 5, indicating that there is no issue with multicollinearity in the data [44].

### 4.3 Data Analysis

The base model includes only the control variables. Hypothesis 1 states that there is an inverted U-shaped relationship between the turnover rate and the achieved revenue with the customer. To test this relationship, the turnover rate is added as independent variable in model 1. Consistent with prior research, the inverted U-shape is described through one linear and one quadratic turnover term. If an inverted U-shape represents the underlying relationship adequately, the linear turnover term should take a positive sign and the quadratic term should be negative [22, 45].

Hypotheses 2 states that the effect of turnover on the achieved revenue with the customer is moderated by the number of prior projects. To test the moderation effect, three terms are added in model 2. The moderator is added as independent variable. In addition, the moderating effect is modelled by multiplying the linear and the quadratic turnover term with the number of prior projects [41, 46].

As the customer data resembles the character of panel data, the Hausman test is applied to consider the individual customer differences correctly. Accordingly, the fixed or random effects model is chosen. In the following, the results are presented.

## 5 Results

The results of the regression models are provided in Table 3. The Hausman test suggests for all models that the within estimator is more appropriate than the random estimator.

The base model includes only the control variables. The control variables account for 6.54 % of the variance in the data. The client industry and contract type are dropped in the within model as they are constants. The intervals are partially significant. The client segments significantly explain the achieved revenue with the customer.

Hypothesis 1 is supported. Model 1 shows a significant inverted U-shaped relationship between turnover rate and achieved revenue. The linear turnover term is positive (524,443.5,  $p < 0.05$ ) and the quadratic term is negative (-912,150.3,  $p < 0.001$ ). The R-squared value rises to 6.83 %.

**Table 3.** Panel regression models

<i>Dependent variable: Revenue with the customer</i>			
<i>Variable</i>	<i>Base Model</i>	<i>Model 1</i> <i>Inverted U-shape</i>	<i>Model 2</i> <i>Moderator</i>
Turnover rate		524,443.5 * (224,619.2)	1,350,803.4 *** (235,844.2)
Turnover rate <sup>2</sup>		-912,150.3 *** (232,127.0)	-75,523.3 (233,147.4)
Prior projects			-2,838.9 *** (195.6)
Interval	partially significant	partially significant	partially significant
Client segment	significant	significant	significant
Turnover rate x Prior projects			-321,749.9 *** (29,141.8)
Turnover rate <sup>2</sup> x Prior projects			-219,561.3 *** (16,593.9)
R-squared	6.5359 %	6.827 %	11.228 %
F-statistic	50.7299 on	43.4773 on	58.9404 on
df	9 and 6,529 df,	11 and 6,527 df,	14 and 6,524 df,
p-value	< 2.22e-16	< 2.22e-16	< 2.22e-16

Notes. Coefficients with significance code. Standard error in parentheses. Customers n = 934. Signif. codes: '\*\*\*' <0.001, '\*\*' <0.01, '\*' <0.05, '.' <0.1

Hypothesis 2 is partially supported. Model 2 shows that the number of prior projects significantly moderates the relationship between turnover rate and achieved revenue. The number of prior projects moderates both the linear (-321,749.9,  $p < 0.001$ ) and the quadratic turnover term (-219,561.3,  $p < 0.001$ ). In addition, the number of prior projects significantly explains the achieved revenue (-2,838.9,  $p < 0.001$ ). Results

show that the number of prior projects influences the turning point in the inverted U-shape such that the optimal turnover level varies. However, we cannot provide evidence based on our analysis that a higher number of prior projects weakens the negative effects of turnover. Further investigations are needed. The variables explain 11.23 % of the variance in the data, showing the highest R-squared value.

## **6 Discussion**

Particularly in IT outsourcing the development of long-term vendor-client relationships is important for success. This study investigates how different turnover rates impact this outsourcing relationship. Results show an inverted U-shaped relationship between the turnover rate and achieved revenue with the customer. The number of prior projects with the client significantly moderates this relationship. The findings make three major contributions. First, a moderate turnover level has a positive effect on the achieved revenue with the customer. Second, the results indicate that IT project teams possess a certain degree of resilience against turnover. Third, turnover has implications beyond the single project perspective on the success of the ITO relationship. In the following, the results are discussed and implications for research and practice are highlighted.

### **6.1 Theoretical Implications**

This study highlights the positive consequences of turnover. Turnover impacts the project as it changes the composition of human capital resources on the team level [30]. Past research presumed that turnover negatively affects organizational performance [12]. Turnover has been predominantly linked to knowledge loss [24, 25]. However, turnover also allows for replacement and, hence, facilitates knowledge gain. This study suggests that the net change in human capital resources varies across different turnover rates. Results show that achieved revenue with the customer is highest at a moderate turnover level, highlighting that turnover can be beneficial for the vendor-client relationship. This finding is contrary to prior studies who state that the relationship is linear negative [45]. The results have several theoretical implications. First, positive turnover consequences suggest a focus shift from the main objective to reduce turnover rates to a better understanding of different turnover rates. An optimal turnover rate may balance dysfunctional and functional turnover [39]. Second, turnover studies on knowledge loss should consider positive turnover consequences. Future research should consider knowledge gain in addition to knowledge loss to assess the net change in human capital based on turnover [24]. Future research can enhance turnover theory by studying positive aspects of IT turnover on the team level. Thereby, different variables beyond knowledge gain, such as team conflict, should be investigated. If, for example, poor performing or conflicting team members leave, this may have a positive impact on the team performance.

The results highlight that turnover bears the chance to refresh human capital resources [29]. The team goes through a constant learning process as team-level competencies change. Thereby, investigating consequences on the team level has implications beyond turnover. Positive effects like the infusion of new ideas may also be achieved by other practices. For example, multi-team or multi-project membership enable an exchange of knowledge between teams and projects [47]. At the same time, multi-team membership reduces turnover intention as it increases job embeddedness [48]. If turnover is accepted as part of the IT culture, this may imply that turnover is not perceived as a shock by the remaining team members [16]. Turnover may be experienced as a common and expected career step. Thereby, IT project teams may possess a certain degree of resilience against turnover. Future research should investigate how many team members can leave the project such that the positive net effect is maximized. This may include a detailed investigation of the turning point in the inverted U-shape. Future research should also consider testing the transferability of the inverted U-shape relationship for other project settings like internal projects. In internal projects the organization represents both provider and client. Similarly to customer projects, these projects may benefit from knowledge exchange. Furthermore, leaving employees may be easier to replace by other employees as the entire knowledge exits on the vendor side and is not split across different parties. However, the vendor faces the full negative consequences of turnover as he is responsible for recruitment and training. Future research could also investigate how the vendor-client collaboration changes when third-party advisors enter into the ITO relationship [49]. Advisory activities such as knowledge and communication management may support the identification of the optimal turnover rate tailored to the vendor-client context.

This paper showed that turnover has implications for the long-term vendor-client relationship. Prior research focused mainly on short-term success, for example project profitability [28]. However, the project perspective is insufficient to capture the full nature of turnover consequences. Particularly in IT outsourcing, vendors may evaluate a project successful if it contributes to the relationship with the client [8]. Relationships evolve over time and across project boundaries. Outsourcing is a strategy that aims to secure long-term access to valuable human capital [33]. A main implication for research is that studies should consider turnover consequences over time and investigate how turnover impacts relationships with partners or customers. For example, turnover can be linked to job hopping to the customer side [7]. On the short-term, this may result in negative consequences for the vendor as the employee's knowledge is lost. However, on the long-term, job hopping to the client strengthens the vendor-client relationship. Customers know that the vendor provides access to valuable skillsets. Leaving employees may still feel connected to the former employer and foster collaborations in future projects. Future research could elaborate on the timely dispersion of turnover effects as the impact of turnover may change. Short-term negative consequences may stay negative, attenuate as time passes, or have positive effects on the long-term. In addition, future research could analyze the interplay between different outsourcing success and risk factors. This study shows that the number of prior projects moderates the relationship between the turnover rate

and the achieved revenue with the customer. Prior research showed that other factors like strong relational governance, information sharing or participation influence the quality of the outsourcing relationship [33, 35]. An analysis of these success factors may provide additional insights for practitioners how to prioritize, for example, which HRM practices best support a high relationship quality and how to combine different practices.

## **6.2 Practical Implications and Limitations**

The results highlight that turnover can have both negative and positive consequences for organizational performance. This has implications for practitioners and managers. Managers must balance the in- and outflow of human capital resources within teams and projects. They need mechanisms which allow them to enable knowledge exchange and identify the optimal turnover rate. Retaining every employee may not be functional. For example, managers should differentiate between turnover to a customer and turnover to another company. In the former case, turnover may benefit the vendor-client relationship [7]. In the latter case, different retention mechanisms may be appropriate depending on the employee's characteristics [31]. Accepting turnover as part of the IT culture implies that teams possess a certain degree of resilience against turnover. By ensuring that crucial knowledge is not possessed by single employees but rather shared within the team, management can support that turnover does not result in a shock on the team-level. In addition, this study showed that the number of prior projects moderates the effect of turnover. This implies that managers must assess the value provided by different knowledge types like firm-specific or IT-specific human capital. The importance of retaining knowledge in contrast to enabling knowledge exchange may differ depending on the short-term project goal and the long-term strategy. This has, for example, implications for the decision whether to invest in a training that is directed to new technologies or a training on unique customer tools.

The study is subject to limitations. First, the results are based on a single representative organization. Turnover consequences may vary between organizations [23, 50]. Future research should consider other organizations and compare findings. Second, our dataset mainly represents the vendor's perspective. As we see this of particularly importance to understand IT project member turnover consequences, future research could examine the consequences in relationship to variables on the customer side like customer's diversification of vendors or applied project management methods. Third, selected variables are not complete but represent a reasonable focus. For example, information about HRM practices was not included. However, the within-organization study design controls for unobserved heterogeneity in the data [40]. Forth, our regression models only show moderate values for the R-squared. However, we argue that IT project success is a complex variable that is influenced by a broad variety of factors. Further, other studies that employed large project archival data sets did not obtain significantly higher values, when analyzing project performance [51, 52].

## 7 Conclusion

This study set out to understand the effect of different turnover rates on the vendor-client relationship success. The scarcity of skilled IT professionals on the current labor market translates into a challenge for organizations to obtain the right skillset. These organizations use outsourcing as one approach to ensure access to valuable human capital resources. Analyzing more than 900 customers and 8,000 projects at a large German IT service provider, this study shows that turnover has an inverted U-shaped effect on the revenue the vendor achieves with the customer. The results highlight that both very low and very high turnover rates harm the outsourcing relationship. Utilizing a human capital lens on IT outsourcing relationships, this study contributes to an understanding of how to assess the impact of different turnover rates from the vendor's perspective and gives direction for managing knowledge exchange.

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