# The Offshoring Elephant in the Room: Turnover

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// Staffing software projects with engineers from inexpensive locations has become commonplace. However, distributed development remains practically challenging because of recurring problems, e.g., decreased productivity, low quality, and high, unforeseen costs. Although it is often overlooked, one of the main underlying reasons for these challenges is high employee turnover. This might be especially noticeable in developing countries with strong economic growth such as India. This article examines turnover of Indian software engineers and introduces strategies to address it. //



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#### ALTHOUGH OFFSHORING PROJ-

**ECTS** are challenging, they promise the benefits of competitiveness, gaining access to large labor pools, and lowering development costs. As a result, globalization of software companies and their partnerships continues to grow.<sup>1</sup> The success rate of distributed offshoring projects, however, remains low, and the realization of expected benefits is often debated.<sup>2-7</sup> Previous empirical studies report that quality and performance problems are usually caused by the underestimated complexity of the work, gaps in competences, the large amount of time required for acquiring the necessary knowledge at a newly established site, and high employee turnover.5-7 Turnover and its consequences in offshoring collaborations is the focus of this article. Based on two recent industrial cases of offshoring to India, we empirically demonstrate that turnover, especially the retention of engineers in the first two years of employment, is a real challenge and share practical recommendations for addressing it.

#### Turnover in the Indian Software Industry

India has become an oasis for software engineering since the early years of millennium.<sup>8</sup> India has attracted numerous contracts from large<sup>9</sup> and small<sup>4</sup> customers worldwide. However, the Asian job market is recognized for its high employee turnover rates<sup>9,10</sup> due to abundant job opportunities<sup>2,3</sup> (see "Measures for Capturing Staff Changes" for definitions). The average yearly turnover in India ranges between 20–40%.<sup>1,9,10</sup>

Turnover is not only an Indiaspecific challenge, it is one of the biggest challenges to global software development in general.<sup>1</sup> Although some studies report that Europe has lower turnover rates than developing nations,<sup>1</sup> market monitoring reports suggest that turnover is a burning issue

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for European countries as well. The United Kingdom experiences 20% turnover, with an average length of service of four-seven years for engineering jobs.<sup>15</sup> Evidently, economic growth could be a more dominant driver for turnover than the geographic location.

#### Why Is Turnover a Problem?

Some may wonder why turnover is such a problem. New hires cost less, and "new blood" brings new ideas and a fresh perspective.<sup>3</sup> Yet research recognizes the disrupting effects of high turnover on organizational performance. Software companies are especially concerned because knowledge-intensive industries significantly depend on intellectual capital<sup>5</sup>; therefore, replacing software engineers often has economic, operational, and behavioral implications.

#### **Economic Impact**

Losing employees results in the hiring, training, and onboarding of new employees who must overcome the learning curve that accompanies any new position<sup>5</sup>; this carries the following direct costs.

- *Cost of recruitment*: includes advertising, interviewing candidates, or contracting recruiting agencies
- *Knowledge transfer and training cost:* involves training new hires either onshore or offshore
- *Travel cost*: entails sending onshore trainers offshore, bringing offshore trainees onsite, and additional exchange visits that increase familiarity among personnel
- Cost of mentoring and support: includes support during the learning process either onshore or offshore.

# MEASURES FOR CAPTURING STAFF CHANGES

Motivated by the challenges associated with portraying the true picture of staff turnover in our research, we outline the concepts important for having good control over personnel changes based on the human resource management literature.<sup>13</sup>

Companies keep track of employees within a fiscal or calendar year. Although often used interchangeably, attrition and turnover are core concepts but do not mean the same thing. When *attrition* occurs, vacancies remain unfilled, while *turnover* refers to the replacement of lost employees. Employee turnover can be external, i.e., when employees leave the company, or internal, i.e., when employees leave the company. Turnover can happen voluntarily, i.e., when employees leave willingly, or involuntarily, i.e., when the company terminates employment. The turnover rate for a period of time is calculated by dividing the number of employees who left by the average number of employees during that period.

#### **Operational Impact**

Turnover problems are associated with the inability to achieve acceptable productivity and quality levels.<sup>2,4-6</sup> A study of turnover impact on large engineering companies in the United Kingdom found that the average lost productivity of replacing an engineer was more than US\$6,500.15 When employees leave, productivity suffers not only because their contribution is lost, but also because those who stay spend time onboarding the new hires; this fact is often overlooked.<sup>3,6</sup> Productivity suffers even when replacements are found quickly; therefore, turnover always affects scheduled commitments as well as the value an organization seeks to deliver.

#### **Behavioral Impact**

One drawback of introducing offshoring is that it significantly impacts the behaviors of onshore and offshore employees.<sup>11</sup> When onshore developers have fears about their employment, they become self-protective and purposefully make it difficult for offshore colleagues to contribute. Poor collaboration makes offshore developers reluctant to engage. Continuous turnover also prevents trust building and often leads to frustrations on both sides.<sup>11</sup>

#### Turnover in DutchCo and SwedCo

Our findings from studying two cases, DutchCo and SwedCo (names are anonymized) offshoring to India (see "Research Approach"), suggest that turnover is a burning issue (see Table 1).

DutchCo, founded in the mid-1990s, is a small Dutch software product and service supplier for customers in the telecommunications domain. Since 2009, DutchCo has outsourced to an Indian vendor, InVend. Their relationship began by employing one

# **RESEARCH APPROACH**

Empirical cases from this article have been published in two separate reports, on DutchCo<sup>5</sup> and on SwedCo,<sup>6</sup> and focus on the true costs of offshoring. Here, we focus on turnover. We added data from three additional years in DutchCo and one year in SwedCo. We reevaluated the DutchCo collaboration with InVend and captured the evolution at SwedCo through additional semistructured interviews, with a specific focus on understanding the role of turnover. For DutchCo, we interviewed the chief technology officer and one of the offshore developers, and for SwedCo, we interviewed an onshore manager on several occasions.

The study is empirical and therefore has limitations. Our findings by no means are generalizable to an isolated company offshoring to India. Product complexity in our cases determined the operational impact, which for simple products or tasks might significantly differ. Finally, many additional factors, including work distribution strategies, cultural differences, temporal dispersion, local leadership approaches, and contractual agreements could potentially influence the behavioral impacts of turnover.

in-house and one offshore team in the first five years and evolved into four mixed teams during the last two years. We found that employee turnover was the root cause of many problems. During eight years of collaboration, they experienced a 36% average yearly turnover and 288% overall. To retain 17 developers at the end of the eighth year, the company hired 40 and lost 23.

SwedCo, a large international company headquartered in Sweden, develops a wide range of softwareintensive products for the telecommunications industry. We studied turnover in one of their products that originated in the 1990s. Because of growing capacity demands and the need to implement customer-specific features, developers from several SwedCo sites worldwide were involved. In 2014, SwedCo onboarded developers from their Indian site. The Swedish developers were set to gradually move to other assignments, while the Indian site was set to become the main development force. Three years later, Swedish developers still supported the Indian site, which struggled with performance. The average yearly turnover in India was 35%, and total turnover for the third year reached 128%. To retain 72 developers in 2017, the company hired 136 developers and lost 64. During our study, we found that the initial perception of profitability, employee motivation, attitude, productivity, and job satisfaction for both collaborations over time decreased (see Figure 1). Although project success is not only affected by turnover, we observed that it played a significantly negative role.

#### **Economic Impact**

At DutchCo, training costs were not explicitly accounted for because of the small amount of collaboration, i.e., employees were trained informally. Travel costs, however, were taken into consideration. During the first five years, these costs reached 5% of the total salary-based yearly costs of offshore employees and doubled in subsequent years. The support effort (i.e., feedback from testing) was estimated in the first five years of collaboration as 4% of the total salary-based yearly costs of offshore employees.

At SwedCo, the continuous mentoring and support through code reviews and consultation were significant and resulted in additional costs of 36% of the total salary-based yearly cost of offshore employees during the first year of collaboration, and 24% in the second year. These needs were motivated by large amounts of complex legacy code that was hard to learn and maintain.

#### **Operational Impact**

At DutchCo, performance problems emerged both onshore and offshore because of the large amount of technical debt. As one offshore developer explained:

The code we started with was completely messed up. It was garbage. If you touched one part of the code, you had ten things breaking.

Naturally, it took a long time for new developers to learn. This is why turnover led to a long period of unsatisfactory performance and delayed profitability when evaluated at the end of the fifth year.<sup>5</sup> Offshore developers progressed slower on the learning curve (three years) than did their peers in The Netherlands (two years); one reason for this was the inability to retain offshore developers long enough to accumulate the critical mass necessary for locally training new hires. In five years, the average amount of unproductive time among the InVend developers amounted to 52%, decreasing over time from 95% in the first year to 25% in the fifth year. But although DutchCo and

Table 1. Case promes and stall changes.			
		DutchCo	SwedCo
Profile	Company location	The Netherlands	Sweden
	Company size	Small	Large
	Industry domain	Telecommunications	Telecommunications
	Indian partner	InVend (external)	SwedCo (internal)
	Time frame	2009–2016	2014–2017
Staffing	Employed (start)	4 (July 2009)	11 (August 2014)
	Employed (end)	17 (December 2016)	72 (June 2017)
	Average number of employees	~8	~50
	Number of employees remaining	23	64
Turnover	Total turnover rate (%)	295 (in eight years)	128 (in four years)
	Yearly average turnover rate (%)	36	35
	Total external turnover rate (%)	205	62
	Total voluntary turnover rate (%)	257	Unknown
	Total involuntary turnover rate (%)	38	Unknown
	Total internal turnover rate (%)	90	66
Reasons	External: Personal reasons (%)	26	Unknown
	External: better opportunities (%)	26	Unknown
	External: termination (%)	13	Unknown
	External: unknown (%)	4	43
	Internal transitions (%)	30	57

InVend addressed turnover, time does lead to people leaving. By the end of the eight-year period, team changes occurred again, resulting in performance problems and decreased trust. Although the actions taken during the years, including reengineering the product, made it easier and faster to learn, turnover still significantly impacted performance.

At SwedCo, the new site's productivity was approximately 25% of the mature developers<sup>6</sup> and remained nearly unchanged for three years,

primarily because of high turnover and overall product complexity. As the onshore manager explained:

At the end of the third year, tasks get done, but the amount of customer value delivered is limited.

Although few developers left SwedCo (i.e., external turnover), wellperforming developers were promoted or moved (i.e., internal turnover), and therefore, did not directly contribute to the code any longer. Also, onshore

mentors were required to spend most of their time supporting new hires, and the loss of their productivity was noticeable.

#### **Behavioral Impact**

At DutchCo, offshore employee turnover significantly impacted their satisfaction with InVend as well as the morale of offshore developers. The productivity problems damaged trust in the supplier's capabilities and affected their relationship. The offshore developers who stayed were

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FIGURE 1. The impact of turnover visualized for DutchCo, SwedCo, and their offshore parties.

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motivated to satisfy the customer and repair trust, even if that meant working extra hours. As one offshore developer explained:

We worked 16–18 h a day five to six days a week over a six-month period. That did deliver results, a real partnership, and satisfaction at work. But it was not sustainable!

The situation improved only after reengineering the product and shortening the learning curves (in the seventh year). The relationship improved and, for a while, a trustworthy collaboration was established. However, when coupled work in mixed teams suffered from the long distance and turnover in the eighth year, things changed again. The behavior of the new hires injured trust, onshore developers became frustrated, and the subsequent escalation to InVend management had a direct, negative impact on job satisfaction and morale offshore.

At SwedCo, we found that turnover had a significant impact on the supporting roles at SwedCo. In the beginning, onshore developers were motivated to engage in the knowledge transfer because they were likely to move on to other challenging assignments. However, after three years of not seeing significant productivity increases due to turnover, some onshore mentors became so frustrated with having to continuously retrain their replacements, that they left SwedCo. Ironically, turnover triggered turnover. As the onshore manager explained:

Developers want to work with other developers who are skilled. If being forced to work a lot with less-skilled offshore developers, they become unmotivated. Turnover also put more stress on the retained employees offshore, thereby lowering satisfaction.

#### Strategies for Addressing Turnover

To address turnover problems, companies may choose to invest in practices that reduce actual turnover or its negative consequences.

#### **Reducing Turnover**

Studies from a leading Indian vendor's 93 offshore projects show that retaining people is a challenge.<sup>10</sup>

Recommendation 1: Provide Additional Extrinsic Motivation. To combat the retention issue in India, companies use various extrinsic motivators in addition to traditional means of competitive compensation and pay, including high quality of work and work life, perks, loans, stock options, overseas assignments, and career progression.<sup>8</sup> Career potential has been recognized as a crucial strategy.<sup>1,5,14</sup>

**Recommendation 2: Ensure Learning and Growth Opportunities.** Career potential includes promotions to managerial roles as well as the satisfaction of intrinsic needs, e.g., becoming a recognized expert. Important intrinsic motivators also include continuous learning opportunities and increasing employability,<sup>8</sup> which satisfy the need for independence and variety.<sup>14</sup>

**Recommendation 3: Provide Intellectual Challenges and Avoid Intellectual Frustrations.** Although routine work and a lack of intellectual challenge increase turnover,<sup>3,14</sup> very high thresholds for becoming a valuable contributor to the project may also significantly increase the turnover.<sup>12</sup> Being a mediocre developer for years is a likely cause of frustration for any developer, and potentially the main reason why many leave.

Recommendation 4: Foster a Sense of Belonging and Relatedness. Outsourcing contracts rarely focus on promoting relatedness and a sense of belonging, which are important motivators.<sup>14</sup> Yet, to succeed, companies will increase integration between the sites, enable direct personal relations between the onshore and offshore engineers, and treat the offshoring counterparts as allies and partners rather than contractors or resources.

Recommendation 5: Screen out "Job Hoppers." DutchCo and SwedCo data show that many engineers leave within the first two years. The pattern of changing companies is known as job hopping and can often be identified during the hiring process. Turnover can be prevented by actively screening out job hoppers during the hiring process. To do so, managers will include a peer-to-peer interview with other engineers to discuss personal drive and ambition or invite a candidate to a social event with a team, during which personal career plans can be discussed informally.

# Summary of the Case Company Experience

DutchCo and SwedCo implemented many strategies to increase motivation and reduce retention, including value-added functions, reduced product complexity, implemented modern technologies and ways of working, integrating sites, and growing their relationship with InVend into a partnership. InVend also helped address turnover by screening out job hoppers. Despite these efforts, the career opportunities remained limited; therefore, after a certain period of time, people still left. In the end, it seems that turnover could not be eliminated from the DutchCo setting. SwedCo had more control over their employees in India than in an outsourcing setting, such as with In-Vend. SwedCo encouraged employees to stay with their company by offering challenges, responsibilities, and a stable career, along with growth and travel opportunities. Yet, the work appeared to be too challenging, and the long learning curves led to significant frustration and increased employee turnover.

**Recommendation 6: Monitor Turnover.** A more general lesson learned from these cases is that isolated turnover rates may be misleading. DutchCo and SwedCo perceived the same rates at various times differently, without understanding why. Our results suggest that although turnover rates are important, it is "who" guits that matters most. Involuntary turnover, i.e., when engineers who are not good enough are fired, will have lesser operational impact. On the other hand, the loss of experienced engineers has serious implications. We therefore recommend monitoring employee experience structures and situations when the critical mass of experience deteriorates, as shown in Figure 2. To do so, companies should maintain detailed turnover records, including the numbers of and reasons behind external/internal turnover, voluntary/involuntary turnover, and monitor the actual staffing experience structure.

#### **Reduce the Impact of Turnover**

If reducing the turnover rate remains a challenge, we suggest making it a smaller problem. As a management representative from DutchCo said:

Attrition is a given fact. We can influence it to lower it, but we can-

not exclude it totally. Anticipating attrition is a much better strategy.

**Recommendation 7: Increase the Volume.** Small offshore assignments tend to be prone to turnover and are typically underprioritized by the offshore vendors.<sup>4</sup> Scaling up the number of offshore developers helps to create a stronger critical mass of people with experience.

#### **Recommendation 8: Use Employee Buf-**

fers. To reduce the impact of turnover, companies may plan employee buffers,<sup>1</sup> i.e., proactively onboarding "shadow resources" as potential future replacements; this strategy is common with experienced vendors. Furthermore, prior research from offshoring to Eastern Europe, India, and China shows that offshoring to mature vendors yields better results because process maturity serves as a safety net to ensure the proper training and efficient management practices.<sup>1</sup>

**Recommendation 9: Support Onboarding of New Hires.** To speed up the process of learning and acquiring the necessary product knowledge, companies should provide sufficient support and mentoring.<sup>6</sup> This includes dedicated expert time, exchange visits, and investments in the training material. In some cases, refactoring and restructuring software code may significantly alleviate the onboarding.

**Recommendation 10: Find Suitable Tasks.** A less-expensive strategy is to offshore tasks that do not demand large amounts of training and high onboarding efforts. As a result, tasks based on well-defined processes and clear deliverables are more likely to succeed than longitudinal complex projects.<sup>7</sup> Here, the rule of thumb is that an employee's average duration of stay shall be longer than the time it takes to become productive.

#### Summary of the Case Company Experience

SwedCo and especially DutchCo have had numerous strategies in place to reduce the impact of turnover. DutchCo reduced the scope of what developers needed to learn; reengineered products; simplified tasks (epics) as an example of new, agile ways of working; increased the number of exchange visits (from two to eight per year); and scaled up the number of offshore developers to create a stronger critical mass of people with experience. All of these strategies, when combined with InVend's employee buffers, helped developers to become productive within one year and offshoring benefits surfaced within this time period as well. SwedCo's experience does not span as many years, and therefore, opportunities for experimentation were limited. SwedCo followed one particular strategy for lowering turnover impact: the active involvement of onshore experts in supporting new hires. As long as the onshore support remained, the impact of turnover was said to be under control, even though this strategy was expensive.

rganizations heavily invest capital and energy to increase productivity, time to market, customer satisfaction, and overall performance. Offshoring is often used to achieve this, whether it is for gaining access to talent and knowledge, lowering wages, or increasing proximity to customers. However, a crucial component, i.e., turnover, is often ignored. We therefore refer to *turnover* as the "elephant in the room" in software engineering offshoring.

Upon examination of our cases, DutchCo needed five years to fully address its high turnover, while SwedCo tried to combat external turnover by promoting people within



FIGURE 2. Employees staying and leaving by competence levels.

the company, ending up with significant project-level losses due to internal turnover. We suspect that this is either because the companies largely underestimated the negative consequences of turnover or accepted it implicitly as a fact of life. At the same time, the damage caused by turnover became a significant cost factor. Furthermore, its magnitude became visible only after several years.

To help companies fight turnover, we created a list of 10 recommendations that decrease turnover rates and the negative impacts of turnover as a deliverable of this research. Our findings may help others to make informed decisions regarding offshoring, taking turnover impact explicitly into account. It may also help with implementing practical changes in daily operations to reduce the negative impacts of turnover.

Our research is country-specific and, similar to the majority of research, focuses on the offshoring destination of India.<sup>1–3,5,6,8,9</sup> Is India special? Maybe, but we cannot be sure yet. There are also signs that turnover has become a challenge for the Western world too.<sup>15</sup> In particular, economic growth appears to be a more dominant driver for turnover than does the geographic location of the company. Other important variables may be present too. Some studies, e.g., indicate that outsourcing relationships experience higher staff turnover than captive sourcing.<sup>5,14</sup> We therefore recommend studying other geographies and paying attention to organizational and project characteristics.

#### References

 C. Ebert, B. K. Murthy, and N. N. Jha, "Managing risks in global software engineering: Principles and practices,"

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in Proc. IEEE Int. Conf. Global Software Engineering, 2008, pp. 131–140.

- E. Ó. Conchúir, P. J. Ågerfalk, H. H. Olsson, and B. Fitzgerald, "Global software development: Where are the benefits?" *Commun. ACM*, vol. 52, no. 8, pp. 127–131, 2009.
- J. Dibbern, J. Winkler, and A. Heinzl, "Explaining variations in client extra costs between software projects offshored to India,"

*MIS Quart.*, vol. 32, no. 2, pp. 333–366, 2008.

- 4. N. B. Moe, D. Šmite, G. K. Hanssen, and H. Barney, "From offshore outsourcing to insourcing and partnerships: Four failed outsourcing attempts," *Empirical Softw. Eng.*, vol. 19, no. 5, pp. 1225–1258, 2014.
- D. Šmite and R. van Solingen, "What's the true hourly cost of

offshoring?" *IEEE Softw.*, vol. 33, no. 5, pp. 60–70, 2016.

- D. Šmite, R. Britto, and R. van Solingen, "Calculating the extra costs and the bottom-line hourly cost of offshoring," in *Proc. Int. Conf. Global Software Engineering*, 2017, pp. 96–105.
- D. Šmite, F. Calefato, and C. Wohlin, "Cost savings in global software engineering: Where's the evidence," *IEEE Softw.*, vol. 32, no. 4, pp. 26–32, 2015.
- D. Moitra, "India's software industry," *IEEE Softw.*, vol. 18, no. 1, pp. 77–80, 2001.
- S. Bagchi, "India's software industry: The people dimension," *IEEE Softw.*, vol. 16, no. 3, pp. 62–65, 1999.
- A. Gopal, K. Sivaramakrishnan, M. S. Krishnan, and T. Mukhopadhyay, "Contracts in offshore software development: An empirical analysis," *Manag. Sci.*, vol. 49, no. 12, pp. 1671–1683, 2003.
- A. Piri, T. Niinimäki, and C. Lassenius, "Fear and distrust in global software engineering projects," *J. Softw.: Evol. Process*, vol. 24, no. 2, pp. 185–205, 2012.
- D. Ford and C. Parnin, "Exploring causes of frustration for software developers," in Proc. Int. Workshop Cooperative and Human Aspects of Software Engineering, 2015, pp. 115–116.
- G. Blau and K. Boal, "Using job involvement and organizational commitment interactively to predict turnover," *J. Manag.*, vol. 15, no. 1, pp. 115–127, 1989.
- 14. J. Bass, S. Beecham, M. A. Razzak, and J. Noll, "Employee retention and turnover in global software development: Comparing in-house offshoring and offshore outsourcing," in *Proc. Int. Conf. Global Software Engineering*, 2018, pp. 77–86.
- G. Pontin and G. Pearson, "The retention gap—What it is and how to tackle it," Assoc. Consultancy and Eng. and EngTechNow. White Paper, 2015.

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