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Employee Retention and Turnover in Global Software Development: Comparing In-house Offshoring and Offshore Outsourcing

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ABSTRACT

Poor employee retention (high staff turnover) has a negative impact on software development productivity and product quality. Further, offshore outsourcing has a widely held reputation for particularly poor employee retention. Interestingly, in-house sites (regardless of location) do not suffer such high levels of staff turnover.

We want to understand the factors affecting employee retention in-house and offshore outsourced settings, to better understand the potential impact of staff turnover on global software development.

The research employed a mixed-method approach comprising two empirical case studies in industry involving 62 practitioners at three international companies conducting in-house and offshore outsourced software development. We collected practitioner perceptions of causal factors for employee retention and performed a cross-case analysis to triangulate our findings.

Practitioners cited employment policies, work-life balance, workplace innovation, product quality, alignment of offshore work hours with onshore, long working hours and adverse impact on health as factors affecting staff retention. In-house offshore have more family friendly employment policies. In the outsourcing sector, the focus on customer satisfaction sometimes leads to less attractive work patterns.

Offshore outsourcing service providers could improve development team member retention by improving work-life balance and adopting more family friendly employment policies.

1 INTRODUCTION

Staff turnover has a negative effect on software development projects [1, 26]; GSD projects are not immune to this effect: turnover can exacerbate the effects of global distance [18], to the extent that Ebert and Jha cite staff turnover as one of the top five risks to GSD projects [12].

Offshore *outsourcing* (to a third party service vendor) appears to experience higher turnover than offshore *insourcing* (to an offshore team of company employees) [25]. Yet, while there is empirical evidence indicating that offshore outsourcing is prone to high staff turnover, there seems to be little research into *why* this is the case.

As such, in this study, we attempt to discover the reasons behind higher turnover in offshore outsourcing teams, as compared to offshore insourcing. We interviewed members of three organizations: a large outsourcing vendor in India, an offshore software development laboratory (also in India) of a multi-national industrial products company, and a medium-sized software product company with globally distributed teams. We observed that the outsourcing firm experienced relatively high staff turnover, while the other two companies had much lower turnover. We also found important differences in the experiences reported by participants from the three companies, including employment policies, work-life

balance, innovation, product quality, work hours, and the way each handles temporal distance. These differences appear to have an effect on motivation, which in turn affects turnover: the participants from the outsourcing firm reported issues such as anti-social working hours and persistent overtime that could negatively affect motivation, while the other participants reported positive experiences in areas such as work-life balance, technical challenges, and team "connectednes," all of which have been identified as positive motivators for software engineers.

We hypothesize that the fundamental differences in the relationship between the offshore site and the onshore "home" site shape the working environment, and hence the motivation of the developers at the offshore site(s): the relationship between the client (home) site and the outsourcing team is defined by the contract, while developers at offshore sites of a company are employees of that company, and so have a more collaborative relationship with their peers at the home site.

This paper is structured as follows: The next section presents previous research on global software development in agile projects, followed by a description of our research methods in Section 3. In Section 4, we describe our empirical findings, which is followed by a discussion in Section 5. Finally, we provide conclusions and possible future directions in Section 6.

2 BACKGROUND

2.1 Global Sourcing Strategies

While there are many variants of sourcing strategies in GSD, in this paper we focus on two types, namely, *Outsourcing*, and *Offshoring*, as shown in Fig. 1. Where our case study outsourcing organizations leverage external third party resources in their software development, and our offshore organization leverages resources from a different country (within the same organization). These definitions reflect the empirically agreed terminology for reporting GSD research in [35]. Of note in [35] is the distance expected, where in an offshore situation time difference limits can be "perceived as small and large have to be defined differently than in the onshore situation. For offshoring, non-overlapping work hours are expected and hence it is more a matter of how many overlapping hours there are between two sites". The authors define *small* as being 4 hours or less different (meaning most of the working day will overlap), whereas *large* is defined as more than 4 hours, implying a small overlap in working hours. This difference in time overlap was further measured in [27], along with geographic, and cultural distance; the values for these dimensions are summarized in Table 1.

2.2 Software Engineer Turnover in GSD

GSD projects are shown to suffer from high staff turnover [12, 18]. Demotivated software development team members have been shown to reduce productivity [8] and software quality [23]; conversely, high levels of motivation can have a positive effect on staff retention [17]. Software developers

Table 1: Degree to which different dimensions of "global distance" increase overall separation between teams. Values are median survey responses, where participants rated each item on a 5-point scale (0 - Not at all, 1 - A little, 2 - Moderately, 3 - A lot, 4 - Very much).

Dimension/Size of distance	Effect
Geographic Distance	
Different building on same campus	A little
Different towns in same region (two hour drive)	Moderately
Less than three hour flight (Frankfurt to Helsinki)	A lot
Transcontinental flight (New York to San Francisco)	Very much
Intercontinental flight (London to Shanghai)	Very much
Temporal Distance	
Transcontinental (five hour overlap)	A little
Intercontinental (three or four hour overlap)	Moderately
Global (one or two hour overlap)	A lot
No overlap	Very much
Cultural Distance	
Uneven language skills	Moderately/A lot
East/West divide in culture	A lot
Different national culture	Moderately
Differenalt organizational culture	A lot
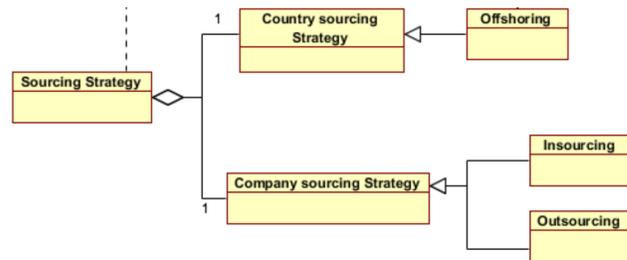
Figure 1: Detail from GSD Project Sub-Ontology according to Vizcaino et al, 2016 [39])

are likely to stay longer in the job if they are satisfied [3] whereas "even organizations that offer competitive salaries and work with leading-edge technologies experience high levels of dissatisfaction and higher than desired turnover among their IT staff." Given that job satisfaction [3, 36], motivators and de-motivation [13, 22, 31] are considered predictors of staff turnover, we look at how working in a distributed environment might influence motivation.

Traditionally software engineers were thought of as introverted, and this view was supported by many studies coming from Couger and colleagues' who measured Social Needs
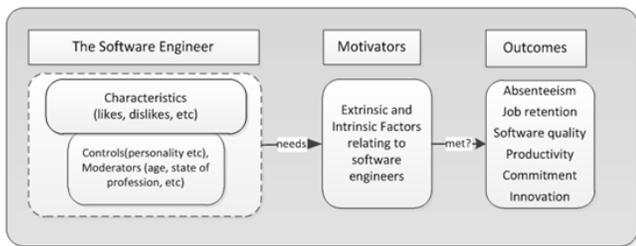
Figure 2: Model of Software Engineer Motivation (adapted from Beecham et al. 2008 [5])

Strength of engineers [9] in their Job Diagnostics Survey. This view is not universal, as seen in the body of more recent research that identified software engineers as sociable people [5]. Certainly, the need for software engineers to communicate and relate to others is crucial in a GSD context [28]; this *relatedness* is one of the three dimensions of Ryan and Deci's "self determination theory" [34] (Fig. 3). The new software engineer profile may therefore reflect the changing demands of the role [6].

Fig. 2 shows the relationship between characteristics, controls and moderators, motivators, and outcomes. The level to which the needs (defined by a software engineer's characteristics) are met by the motivators will impact on tangible outcomes (note that "Job retention" is an outcome). For example, Hall et al. [17] found a positive correlation between software engineer motivation and employee turnover. Another outcome is project success, where Verner et al. [37] found a positive correlation between motivation and software engineering/management agreements on project success.

Table 2 gives a breakdown of software engineer characteristics as listed in Beecham et al [5], and how these needs are met by working in a distributed environment (as extracted from [4]:

As shown in Table 2, need for stability (within the organization and geographically), and being introverted are not compatible with operating in a changing world (with low compatibility).

Looking at the motivators, also in [5], there are several factors that are likely to threaten motivation, for example the study on motivation in GSD [4] hypothesized that, based on case study observations, both extrinsic and intrinsic motivators are challenged.

Table 3 lists external *extriinsic* influences (not directly related to the job itself), that are challenged by working in distributed teams or remotely. Work/life balance and Sense of belonging/supportive relationships are a lot more difficult to achieve when considering global distance. Especially where there is little time overlap in core working hours, as described in Section 2.1.

We often turn to the open source community to understand what motivates developers to develop software (independent of extrinsic rewards such as salary). In the empirical study of Lin et al, they note that motivation of open source developers to participate, and by implication remain, in open source

Table 2: Software Engineer Characteristics and GSD Role

	Characteristic	Compatibility
1	Need for stability (organisational stability)	Low
2	Technically competent	High
3	Achievement orientated (e.g. seeks promotion)	Medium
4	Growth orientated (e.g. challenge, learn new skills)	High
5	Need for competent supervising	Medium
6	Introverted (low need for social interaction)	Low
7	Need for involvement in personal goal setting	Medium
8	Need for feedback (needs recognition)	Medium
9	Need for Geographic stability	Very Low
10	Need to make a contribution (worthwhile/meaningful job)	High
11	Autonomous (need for independence)	High
12	Need for variety	High
13	Marketable	High
14	Need for challenge	High
15	Creative	High
16	Need to be sociable/identify with group	High
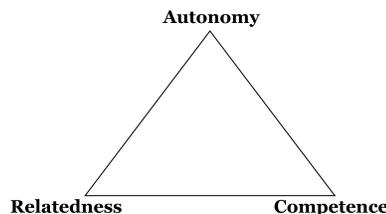
Figure 3: Self-determination Theory Psychological Constructs.

projects is influenced by the identification of participants, the transformational leadership of leaders and an active management style, and the emotions of developers [20]; their study of five open source projects suggests that, to retain developers, they need to contribute early to a project, and focus on coding rather than documentation. Developers working on open source projects are working in virtual teams, and could be considered to have similar experiences as those developers working in multi-site commercial projects.

3 METHODS

A mixed method approach has been adopted comprising two case studies and a cross-case analysis. The first phase (Case Study A) comprised a multiple case study of 53 practitioners from two multinational companies; employing a Glaserian grounded theory analysis of documentary sources, practice observations and interview transcripts [2, 16].

Table 3: Extrinsic motivation challenged by virtual team practices

Extrinsic Factor	Virtual Team Practice (drawn from case study)
Rewards and incentives (e.g. scope for increased pay and benefits linked to performance)	Requires objective measurement, and as such is independent of location – however making sure that rewards are given to each employee fairly across different locations may not be achievable, e.g. some remote workers were not able to take time off in lieu for working long hours and overtime.
Good management (senior management support, team-building, good communication).	Becomes even more important when working remotely – extra pressures, extra layer of complexity requires experienced and confident managers to deal with unforeseen problems. A recurring theme was that remote projects required experienced managers that can communicate well with both customers and all team.
Sense of belonging/ supportive relationships	Difficult to feel supported when your counterpart might be sleeping during your core working hours. However the organisation had a strong corporate culture, clearly communicated in all interviews.
Work/life balance (flexibility in work times, caring manager/ employer, work location)	Extremely difficult to achieve, when there is a lot of travel, working away from home (and family), and keeping work hours down to core times seems impossible. It was rare to hear any reports of people working sustainable hours when working remotely.
Employee participation/ involvement/ working with others	Some experienced managers working remotely, did not want to participate with the wider organisation; finding interference from higher management to be a negative influence. They tended to want to be left alone to sort out their customer facing issues. A fine balance needs to be struck between participation, and a top-down style of management that imposes the processes.
Appropriate working conditions/ environment /equipment/ tools / physical space /quiet	Working conditions specially affected remote workers. For example, when working onsite with customers they often did not have any influence on where they work, or how and sometimes, when. They were not able to separate themselves from being on call to the customer: there was a tension between dealing with customer demands and their tangible deliverables.
Sufficient resources	Resources were scarce in terms of people – (individuals were stretched to fill the gaps).

Table 4: Case study company characteristics

Company	Company Sector	Employees	Revenue, 2016 (Gross Income)
IndProdCo	Industrial Products	362,000	€79.6 billion
OutsourceCo	IT Service Provider	8,000	US $420 million
Pracmed	Software Vendor	300	€20 million

In addition to Case Study A, during our second phase, we conducted a 14 month longitudinal embedded case study (Case Study B) in a medium sized software development company.

Finally, we employed a cross-case analysis to triangulate our findings.

3.1 Case Study A

3.1.1 Research Sites. The companies selected for inclusion in this study are from a population of large enterprises engaged in outsourced or off-shore software development, as shown in Table 4.

Intensity sampling, which targets a larger number of interview participants with different responsibilities within the same unit of analysis, was employed to obtain richness and depth in the study [30, p. 234]. Perspectives from participants with different responsibilities were obtained in order to triangulate the data. Responsibilities included: developers, testers, project management, programme management and corporate-level executives.

The Indian IT Services company (known here as OutsourceCo) selected for the study, is a well-known mid-sized vendor in the worldwide software service outsourcing sector. OutsourceCo has Fortune500 company clients in Europe and North America and specialises in the travel sector.

The industrial products company (known here as IndProdCo) has headquarters in Europe and has divisions in industrial automation and health. The software development centre in India is one of several worldwide technology centres.

3.1.2 Data Collection. The study was supported with documentary sources, such as publicly available white papers, technical reports, case studies, descriptions of vendor capabilities and web hosted marketing materials.

On-site visits to secure work environments enabled first-hand observation of working practices and workplace environments. Scrum teams coordination meetings (stand-up meetings) were observed. Distributed scrum teams use video-

Table 5: Case study participants

Company	Participant roles
`IndProdCo` (26 participants in Bengaluru (Bangalore), India)	Scrum Master (4) Chief Manager & Agile Coach (1) (Sub-)Segment Head (2) Quality Assurance Manager (2) (Senior) Developer (4) Tester/Test Lead (3) (Part) Product Owner (2) Programme Manager (1) Project Manager (2) Technical Lead/Architect (5)
`OutsourceCo` (27 participants in Delhi, India)	Chief Technology Officer (1) Corporate Lead Architect (1) General Manager, Human Resources (1) Delivery/Programme Manager (3) (Senior) Project Manager (3) Scrum Master (2) Technical Analyst/Consultant/Specialist (6) Team Member (9) Business Analyst
`Pracmed` (9 participants in Ireland and North America)	Product Owner (2) Software Developer (5) Tester (1) Scrum Master (1)

and audio-conferencing technology to enable virtual team coordination meetings.

However, the primary data collection technique employed in the study was face-to-face interviews conducted with 53 practitioners performed between May 2012 and March 2016, as shown in Table 5. The interviews were typically 50 minutes long and structured using an open-ended interview guide. Probing questions were used to encourage interviewees to raise any topics, issues and concerns outside the scope of scripted interview questions.

3.1.3 Data Analysis. Audio interview recordings were transcribed and then imported into a qualitative data analysis software tool, Nvivo V9 [29]. Audio interviews and each corresponding transcript were then reviewed for consistency.

A Glaserian approach to grounded theory was used for data analysis [14]. Topics were identified within the interview data and then coded into concepts by comparing within and between interview participants. Next, these concepts were iteratively grouped and refined into selected interview categories using constant comparison.

Descriptions of each selected category, with illustrative example quotations as evidence, were used to create examples of memo writing [15, Chapter 12]. These memos evolved and

changed during the analysis where categories are refined and sharpened.

3.2 Case Study B

Case Study B was a participant-observer study, focusing on a development team from a medium-sized Irish-based software company that develops practice and lab management software for the optical industry.

Pracmed employs approximately seventy staff members in its software development organization, including support and management staff. Pracmed's annual sales approach €20 million, from customers across the British Isles, continental Europe, Scandinavia, North America, and China.

Case Study B focused on TeamA, whose responsibility is to tailor the company's product for a large customer in North America. The members of TeamA are distributed over four countries on two continents (see Table 5), with up to eight hours difference in timezones between locations. They are using Scrum to develop their software, with two weekly sprints.

3.2.1 Data Collection. We observed TeamA from January, 2016 to March, 2017. Specifically, one of the authors observed approximately 200 of TeamA's Scrum ceremonies, including daily standups, sprint planning, backlog grooming, and sprint retrospectives. Due to team members being distributed across Europe and North America, the observations were made via video conference for each ceremony. The same author also conducted semi-structured interviews of each member of TeamA, which were recorded and transcribed. The interviews took approximately one hour and followed an interview protocol available from [7].

The observer also made contemporaneous hand-written notes during both the ceremony observations and interviews. Finally, the interviewer summarized the interviews using a mind-map, and presented the result to five interviewees in an online workshop to validate the insights gained from the interviews.

3.2.2 Data Analysis. Given that Case Study A was completed by the start of the data analysis phase of Case Study B, we took a deductive approach that attempted to find evidence in support of, or contradictory to, the themes generated by Case Study A. We examined interview transcripts for comments illustrating or elaborating these themes, and our observational notes for events related to themes.

3.3 Cross Case Analysis

While the case study approach is well established in software engineering [33], this research has employed a cross case (or cross site) analysis to explore similarities and differences among cases [24]. We use multiple cases in order to establish the range of generality and conditions of applicability of each approach [16].

Our approach does not synthesise data from multiple case studies [10, 11], but rather use a cross case analysis to facilitate the comparison events, activities, and processes considered important for each case [19, 24]. We have purposively selected the Case Study A and Case Study B in order to contrast features of the in-house offshore and outsourced offshore context.

4 RESULTS

4.1 Length of Service

The results here confirm anecdotal evidence of high staff turnover in the offshore outsourcing sector. Length of service: "$2\frac{1}{2}$ years" (Senior Software Engineer, OutsourceCo). "I have been working [here] for 1 year" (Scrum Master, OutsourceCo). Length of service: "$1\frac{1}{2}$ years" (Senior Software Engineer, OutsourceCo). Length of service: "I have been working here for the last 2 years" (Software Engineer, OutsourceCo).

There is an expectation of high staff turnover in the outsourcing sector "if you work for a company like [a major Indian outsourcing company] or something. . . within 2 years you generally shift companies" (Developer, IndProdCo).

In contrast, working in-house for an international company even in an offshore location, there is improved retention, "I have been working here for $8\frac{1}{2}$ years. I joined as a fresher right out of college" (Developer, IndProdCo), "$10\frac{1}{2}$ years I have worked here" (Architect, IndProdCo), "11 years" (Quality Manager, IndProdCo), "Fourteen years about to complete" (Quality Assurance Manager, IndProdCo) and "$9\frac{1}{2}$ years" (Technical Lead, IndProdCo).

Participants witness long service and high staff retention in the in-house offshore sector "[in] my team of 9 only 3 people are freshers. Otherwise, everyone has 8, 9, 10 years experience" (Developer, IndProdCo). Indeed, the *average* length of service on TeamA was over 7 years, with one senior member having over 20 years tenure. Three of TeamA's members started with Pracmed as interns, and four have spent almost their entire careers with the company. Interestingly, one of TeamA's members used to work for an outsourcing vendor in India before joining Pracmed in Ireland.

4.2 Employment Policies

The positive employment ethos of working in-house for an international company is reflected in the offshore location, "they have good policies, employee related policy" (Developer, IndProdCo). Such policies include inculcating a collegial and supportive work environment,

> "we have open communication with colleagues. We share a lot of things. We help others. This helps to reduce a lot of tension and pressure in the workplace" (Test Lead, IndProdCo).

and "everyone is so supportive for getting the job done" (Senior Developer, IndProdCo). Practitioners describe a high level of autonomy in their work "nobody ringing me saying, 'Okay, you have to do this, this, this.' Because we are self-organised basically" (Technical Lead, IndProdCo).

Pracmed also tries to treat its offshore staff as equal to those at the home office: every year, *all* development staff are flown to Dublin for a week-long developer conference. Also, Pracmed has an ambitious growth-by-acquisition strategy; they make substantial efforts to integrate development teams from acquired companies into their organization.

4.3 Work-life Balance

Practitioners describe respect from the employer towards home life "we come here for professional work, but we have another place to go after work that is to our family" (Senior Developer, IndProdCo), "[IndProdCo] respects our family as well" (Architect, IndProdCo) and "if there is any problem, I can go home whenever required" (Technical Lead, IndProdCo).

Employee-friendly policies are seen as supporting staff retention, "If I have an emergency [at home], I don't need to worry if I have leave or not – my manager approves [time off]. There is work-life balance. . . that is one reason why many people stick with the company" (Scrum Master, IndProdCo).

Another example, from Pracmed, involved a project manager who considered resigning to spend more time with her young children; Pracmed made adjustments to her work schedule to accommodate this need.

4.4 Workplace Innovation

Practitioners at IndProdCo describe workplace innovation as a driver for staff retention,

> "[we have an] innovative culture, where we are allowed to think freely and come up with our own ideas. Then, we can file our own invention disclosures. Those are discussed and taken forward for patent filing" (Architect, IndProdCo)

We did not find any evidence of innovation patenting in OutsourceCo.

4.5 Product Quality

Many practitioners at IndProdCo emphasised the importance of product quality "Quality is always a challenge for us, but [IndProdCo] always has a focus on quality" (Quality Assurance Manager, IndProdCo) and "there are a lot of [quality assurance] processes. . . we are minimising the defects" (Chief Manager, IndProdCo).

Lean practices are used to ensure the focus on quality "there is 'stop the line,' where the team is empowered to raise an issue related to quality" (Product Owner, IndProdCo).

Senior management monitors product quality during the development process "each version of the product. . . has five quality gates, wherein quality at every stage is being checked. And then it is reported to higher management" (Project Manager, IndProdCo).

Practitioners at IndProdCo describe this commitment to product quality as a driver for staff retention, "It's also a reputed company, which produces a good quality product. . . This helps us to stay longer in [IndProdCo]" (Test Lead, IndProdCo)

Pracmed also places emphasis on quality: junior developers are required to have their code reviewed by a senior developer. But this is seen as positive: "you do have a better product at the end of the sprint. There are a lot of checks and balances within the sprint at the same time there [is] more and more communication." (Junior Developer, Pracmed)

4.6 Alignment with Onshore Work Hours: Antipattern

Some outsourcing teams are required to shift their usual work hours to maximise time shared with onshore clients, for example "we are four and a half hours ahead right now, so we have half day when we really can talk to [the clients] and organise any meetings" (Senior Project Manager, OutsourceCo).

> normally our working hours in India are 9 to 6 but we are working from 11 to 8. And as a team lead, I stay in the daylight saving times I stay one hour more, so that we get a full two hours of overlapping with the team at onshore (Technical Analyst, OutsourceCo).

Again, "[normally] we leave at 8pm, so by 9pm I'm at home. . . [the onshore client] is providing us with [taxi] cabs [to get home]" (Software Engineer, OutsourceCo).

It is not clear if shifting work hours is a requirement from clients, or if outsourcing vendors offer to shift work hours as an inducement to attract customers. None of the teams at IndProdCo reported aligning work hours to the onshore corporate headquarters time zone. This is also true of Pracmed; despite being highly distributed across Europe and North America, there is no attempt to synchronize working hours.

Rather, TeamA sometimes tries to take advantage of the time difference: "It would helpful if everybody was in the same room but in our case. . . we have the advantage of people in different time-zones. They [DBA in Dublin] are given some work that I am doing at the moment then will be working on it during the day. Then the DBA can handover to me in the next morning." (Senior. Developer, TeamA)

by having Senior Developers in Dublin do code reviews of North American developers' output.

4.7 Work Hours: Antipattern

Outsourcing vendors require staff members to work additional hours, for example "towards the end of a sprint we may be putting extra hours, sometimes" (Senior Project Manager, OutsourceCo). For some team members the need to work late happens if there is a technical problem "sometimes if there is a challenge on the team. It does put pressure on us. So that we give some extra hours" (Scrum Master, OutsourceCo).

Practitioners do not view the need to work long hours positively, "sometimes we have to stay [at work] late, so it feels bad" (Software Engineer, OutsourceCo).

In contrast, working in-house for an international company

> "the work is really good, in the sense that you have regular timeslots of nine hours, they don't

> ask you to work on Saturdays, Sundays. The work-life balance is really good here" (Developer, IndProdCo).

This quote is illustrative of several similar comments made about working hours at IndProdCo.

In contrast, Pracmed has an unwritten "9 to 5" policy: while we observed occasional examples of senior team members working late to solve an urgent customer problem, in general Pracmed seems to adopt a sustainable pace philosophy with flexible working hours to accommodate school schedules and other family requirements.

4.8 Adverse Impact on Health

In the outsourcing environment, long work hours are considered unhealthy by practitioners. For example, "that pressure [to deliver] comes after every sprint, at the end of every sprint. It is not healthy I fear" (Senior Project Manager, OutsourceCo).

Similarly,

> "If one day we stretch to 12 working hours, it's more than enough. So, if you're continuously working 12 hour days, your health goes down. You can't think anymore" (Senior Software Engineer, OutsourceCo).

We found no evidence of practitioners identifying negative health impacts of work at IndProdCo or Pracmed.

5 DISCUSSION

The findings from our cross case analysis identify issues around employment policies, work-life balance, workplace innovation, onshore work hours alignment, working hours, and impact on health.

We found evidence of family friendly policies at IndProdCo and Pracmed. For example, time-off from work to deal with a family emergency, sustainable work hours, a culture of communication and respect were all cited as important by practitioners.

In contrast, at OutsourceCo there seemed to be a much more immediate focus on client satisfaction leading to issues around long working hours as well as evening and weekend working.

We observed another important distinction in the area of product innovation and product quality. For IndProdCo and Pracmed there was a sense of pride and ownership of the product being produced. The commitment to quality was striking in practitioner responses. While at OutsourceCo the product belongs to the client and the commitment quality was sometimes subsumed by the need for productivity to meet client demands.

These findings can be summarised, as shown in Table 6, by saying that in OutsourceCo client satisfaction was achieved through productivity and responsiveness to customer demands; while in IndProdCo and Pracmed, there was a greater emphasis on product quality and product innovation.

Previous studies have shown that developer motivation and attrition are linked: highly motivated developers are more

Table 6: Outsourced and In-house Comparison factors

OutsourceCo	IndProdCo	Pracmed
Customer Satisfaction	Reputation for Innovation	"Best of breed" product
Productivity	Product Quality	Product quality
Client Need	Work Life Balance	Work Life Balance

likely to remain in their current jobs, while lack of motivation may result in attrition [5, 38].

This may be part of the reason that some GSD projects experience high staff turnover, and others do not: the nature of the work, and the working environment, in different kinds of GSD may reduce or exacerbate staff turnover.

Ultimately, software developer motivitation can be distilled into three factors, as proposed by Ryan and Deci [34] in their self determination theory. These three factors – relatedness, competence, and autonomy – capture the software developer's need to be part of a team, to learn new skills and develop existing skills, and to exercise those skills to the best of his or her ability; Ryan and Deci also note, however, that these dimensions need to be balanced: autonomy without competence can lead to stress, while lack of connectedness can lead to a feeling of isolation [28, 34].

Are our results consistent with self determination theory? We consider the three dimensions in turn:

Relatedness. The employment policies of both IndProdCo and Pracmed help to promote a sense of belonging, to one's team and to the larger organization. It could also be argued that a degree of relatedness is necessary for innovation: exchange of both ideas and experience among developers would help innovative ideas progress to implementation.

Competence. Competence is crucial for quality: quality software cannot be produced by unqualified developers. Competence is also a necessary pre-requisite to innovation: in a technical context, innovation derives from engineering skill that enables a developer to carry an idea through to a patentable innovation.

Autonomy. We noted an emphasis on individual autonomy at IndProdCo. This is somewhat less true of Pracmed at the individual level, but at the team level, Pracmed's development teams follow the Scrum philosophy of self-organization. In previous research, we have hypothesized that competent developers will not be motivated unless they have sufficient autonomy to exercise their competence [28]. It appears that, in the case of our offshoring companies, both conditions are met.

5.1 Implications for Practice

Our findings show that IndProdCo and Pracmed have done an excellent job in creating an attractive workplace culture, evidenced by the length of service and low staff turnover we observed.

There are attractions to working in the outsourcing sector. Such companies provide opportunities to work with many clients, technologies and cultures in a relatively short period of time, when compared with a traditional career path of moving job from one company to another.

However, in the outsourcing context, line and personnel managers need to make more strenuous efforts to create an attractive working environment. Greater effort to collate and reward innovations could be a useful tool. But our evidence suggests that paying attention to work life balance and employment policies would seem to be key.

5.2 Limitations

We have adopted four criteria for exploring the trustworthiness of naturalistic research findings, following the approach of [21, Chapter 11]:

- Credibility,
- Transferability,
- Dependability, and
- Confirmability.

In 'real-world' research it is not easy to manipulate experimental variables to establish causal relationships [32]. As a consequence, the quality criteria we have adopted attempt to address broad questions of research validity and reliability.

Credibility, in a sense, relates to the 'truthfulness' of the research. We seek to conduct research in such a way that the findings are found 'credible' by researchers and study participants.

Transferability addresses the applicability of research from one group of study participants to another given a similar context. From this perspective, we need to understand the circumstances affecting each group to judge their similarity in order to understand the likely application of the research findings.

Dependability relates to the consistency or repeatability of the research.

Confirmability in research concerns researcher neutrality or objectivity in their interactions with the study context. A new and independent observer should be expected to draw similar conclusions from their findings in confirmable research.

The mixed-method research approach we adopted enabled us to triangulate findings from OutsourceCo and IndProdCo in Case Study A and TeamA from Pracmed in Case Study B.

We also performed a methodological triangulation by using an embedded participant observation study in Case Study B as opposed to the multi-case study approach in Case Study A. These strategies together minimise researcher bias (confirmability) and enhance transferability of the findings.

We have attempted to demonstrate a rigorous approach to data collection and data analysis in order to enhance research credibility and dependability.

6 CONCLUSIONS

This research takes as its starting point the observation that poorly motivated software team members have a negative

impact on productivity and product quality. We have investigated the question: *What do practitioners perceive to be the causes of high staff turnover?* And then focusing on the question: *How do practitioners explain staff turnover for in-house offshore and offshore outsourced projects?* We observed significant differences in length of service between the in-house and outsourced work context.

In order to explain the differences in length of service, this research adopted a mixed methods approach comprising a multi-case study involving two large multinational companies and a longitudinal embedded case study in a medium sized software development company.

In Case Study A, 53 practitioners were interviewed to compare and contrast the in-house offshore setting (an offshore development centre that is part of a larger international company) and an offshore outsourcing service provider.

In Case Study B, a participant observation study was conducted over a 14 month period. A geographically distributed team was investigated in-depth, including interviews with 9 of its members.

Our cross case analysis findings highlight issues around employment policies, work-life balance, workplace innovation, onshore work hours alignment, working hours and impact on health.

In the outsourcing context, development team members are client-facing and expected to contribute to achieving good customer satisfaction. Emphasis on good customer satisfaction focuses on development team productivity; with poor productivity being masked for the client by long working hours within the development team. While innovation and elegant solutions are desirable there is a pervasive awareness that the development artefacts produced by the team belong to the onshore client.

In the in-house offshore context, in contrast, the team are very much nurturing their own product. The development artefacts produced by the team belong to the team. Of course the team are incentivised by client satisfaction, but through a focus on product innovation and quality. Employment policies and employer commitment to work-life balance are designed to nurture and retain good quality staff.

We speculate that offshore outsourcing service providers could reduce staff member turnover by improving work-life balance and adopting more family friendly employment policies. Further, outsourcing service providers could reward innovation more effectively and structure contracts to enable software product ownership to improve staff retention.

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