Challenges in Human Resource Management: Software Product Development & Software Service Firms

Systematic Literature Review

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I. GROUP MEMBERS

The percentage of commitment for idea creation and report writing by the respective group members involved in writing literature review are given below.

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Abstract— **For any software firm Human resource Management (HRM) is very important. The HRM helps in planning and organizing resources for a project team. In this Paper, we present the Systematic literature review on the challenges of HRM in software firms. The selection criteria is based on pre published studies for reviewing. 10 primary studies were identified, reviewed and results are reported. Furthermore research can be done in this area to mitigate challenges and yield better software product and services by providing easy ways for practitioner.**

Keywords— Project-oriented company, Managing of Projects, Managing by projects.

II. INTRODUCTION

Context:

For any Project it requires Project teams and corresponding team members but it's certainly not sufficient, it has to be organized, this job is done by HRM. The main purpose of the HRM for a project is to acquire, develop and manage the team by providing reasonable resource on needy basis for better yield.

HRM uses the man power for developing a quality product in software firms. The HRM should take care that the energy contribution by employees is not wasted and in order to do so HRM utilizes various processes and methods.

In software firms HRM take care not only on the merits but also on demerits or challenges in a particular field of knowledge, checks how a team member utilizes mitigation strategy among the team which makes the review important as there are many challenges in performing HRM.

Background:

The software industry has team members at various level like management, technology, administration which are indeed concrete spaces where the HRM is necessarily involved. In this technological era, the segregations in the software firms evolved, which are
 a) The one that develop software products and
b) The one that provide Software services, both of them have their own development life cycle, market value and competition.
 So, in both these firms HRM play a strategic role and is bounded to the performance and innovation. To achieve these they need to overcome challenges.
The software product and service firms need employees who satisfy the conditions like good experience in respective fields, quality they deploy, attitude of being professional at work for better pushup in completion of project and satisfy the costumer requirement's which can be made only possible through HRM.

In recent years, employees face many new challenges that are complex and are interlinked with deeper insight, these riddles and challenges must be looked into and compensated, which justify the need for this review conducted.

Objectives:

We present the systematic literature review based on the challenges that are faced by HRM in maintaining the project. Our objective was mainly focused on finding how far the HRM are doing their prescribed work in reducing the challenges. These challenges that we speak about can be reduced by following required standards that are predefined.

Check whether the elucidated standards that usually many professionals don't follow while implementing the HRM is big calamity and the awareness about the actual standard to be followed is bought under notice for long run perfect Software firm.

The questions addressed deal with the mitigation strategies and verify whether they are same as the one that are implemented in industrial practice for the challenges listed if not then bring awareness for the required change.

Methods:

We used IEEE and INSPEC electronic databases for gathering the relevant information for our literature review.

We followed the kitchen ham's and charter's guidelines for performing systematic literature review [1].

To have a complete search for the primary studies and also in order to specify the review question based on the data that is extracted. Our literature review is based on the (inclusion/exclusion) criteria for accurate search strings.

To filter them we used study selection criteria for our primary study synthesis.

Assessment of quality was made based on both qualitative and quantitative measure and also on whether the paper reviewed is stated with a clear aim. Level of understandability cohesion with other articles.

We used Text editors and notepads for the reediting phase for collection of data and store them to asses evaluate and answer the research questions and to concise the relevant information from the articles.

Results:

Firstly search string is elevated and the results were based on English papers between (1990 to 2015).

Second step involved more elevation based on journal article.

Next the elevation is based on excluding challenges in field area other than software firms.

Finally, we choose only papers that give clear vision on challenges of those which have full text.

1) In INSPEC database total 13 search results were found of which 2 served as evidence for our study basis which is elaborated in further notes.

Few of them were relevant, that mainly focus on the challenges faced in Software Firms only those are considered for Primary studies.

2) In IEEE database total 11 results were found for study criteria, 5 served as the evidence for primary studies.

The evaluation is based on the challenges we were interested in discussing.

From results we observed every challenge is interlinked, when a new project is given to HRM to complete within threshold time. They can be avoided if they follow the mitigation strategies at right time, right place, for right reason.

Our finding emphasizes on the guidelines that are standard for better software product outcome.

We also summarize on the type of possible debris that occur if the correct mitigation guidelines are not followed.

Conclusions:

Our overview helps software practitioners to correct themselves irrespective of level at which they work, for coordinating, mitigating the gap and this in turn helps software firm development.

Our overview helps to understand the challenges faced if the mitigation guidelines are not utilized and implemented correctly.

The quantitative effect of HRM in software product and service firms during run time of project is not reported.

III. REVIEW QUESTIONS

RQ1) What are the challenges faced by HRM in Project oriented Software product development and software services firms?

Motivation: People need to be aware of how crucial it is to take a proper decision and how these decisions effect the project.

Our motivation is that the challenges that we discuss should be clearly explained to the practitioner about the effect on quality of product.

Explanation: We found that normal challenges in HRM doesn't seem important but they effect firms.

We reviewed the effect of implementing the wrong guidelines and their impact over the quality of the product under development.

We also emphasized on whether these challenges arise by not following the standards predefined.

If this predefined standard is known to the employee his rate of impact will be dramatically increased.

We also take into account the compensation of the current challenge using correct mitigation strategy then the new challenge that arise. The scope and influence of that new challenge is either high or low if high which in turn help to understand whether the proposed mitigation strategy to be compromised.

RQ2) What are the Mitigation strategies for cultural and behavioral challenges that are handled by HRM?

Motivation: Our motivation is that different people across various positions have different abilities and possess some peculiar skills.

When there is a need for the firm to utilize such talent from different culture then the firm must bind strict rules for good relation with other Global cultures.

Our motivation is that there is a significant concern to look into the Teams with respect to culture affects as its impact is shown in one way or the other.

The behavioral barriers also need to be compensated as they impose inferiority complex and reduce the communication. The behavioral barriers sometime even lead to complete ignorance on an employee.

Explanation: We reviewed how culture effects the organizational team work. We also reviewed that no cultural imbalance reside and if they reside, should be wiped off by following various measure and advices and to build cohesiveness.

We reviewed on the cultural sensitivity that can be improvised by mitigation strategies, these challenges both the cultural and behavioral challenges should be completely

removed otherwise the implications that arise which clearly show their impact on the quality, reputation and employee interest to work in the firm.

RQ3) Challenges faced by software industry and also HRM when employee voluntary turnover and also in work distribution strategy failure?

Motivation: Our motivation for the concentration in employee turnover rate is main since the increase in turnover, effects the company. No company wants to lose a good employee. Focus on choice of Work distribution between the team members is included. The criteria of solving the employee leaving the company must be reduced in large extent it can't be neglected. Our motivation is that the firms should have some key guidelines for making employee comfortable.

Explanation: We reviewed that the employee need to be given certain protection rights and help him to settle inside the organization. We reviewed that if the necessary proper real time implementation of work distribution done improperly then it has serious effect on the turnover rate of the employee.

We reviewed the effect of employee turnover rates if very high it effects the firms project development process due to lack of skilled workers.

IV. REVIEW METHODOLOGY

The following research protocol had been used. It defines the pilot study, at sources and the search strategy and the approach to the search selection. Study quality assessment, data extraction and data synthesis.

Pilot study:

We developed our research protocol based on three different pilot studies which helped us in,

- Review, refine and rephrase our research question.
- Increase the search terms to help obtain more relevant articles for the primary studies.
- Confine the review to specific research scope topic

Refining the research question and research string:

The research question we formulated contain the following keywords:

IN IEEE: challenges, Human resource management, software industry.

The research question that we used for primary study is "(challenges of Human Resource management in Software Industry)".

In INSPEC: A research question is constructed based on the keyword s that were used in formulation.

((human resource management) WIN ALL)OR ((IT team work) WIN ALL)) OR ((challenges OR limit OR drawback OR effects) in product and service development) WIN ALL)).

We used the Boolean operators for our search we use the above set of key words for refinement in the research question.
Search strategy:

Initial search for primary studies was carried out in IEEE in which based on the search string we found eleven results out of which only 5 are related to the literature review

we want to do.

Later the search is conducted in INSPEC and out of thirteen papers we took 4 papers that were very much related to the review topic.
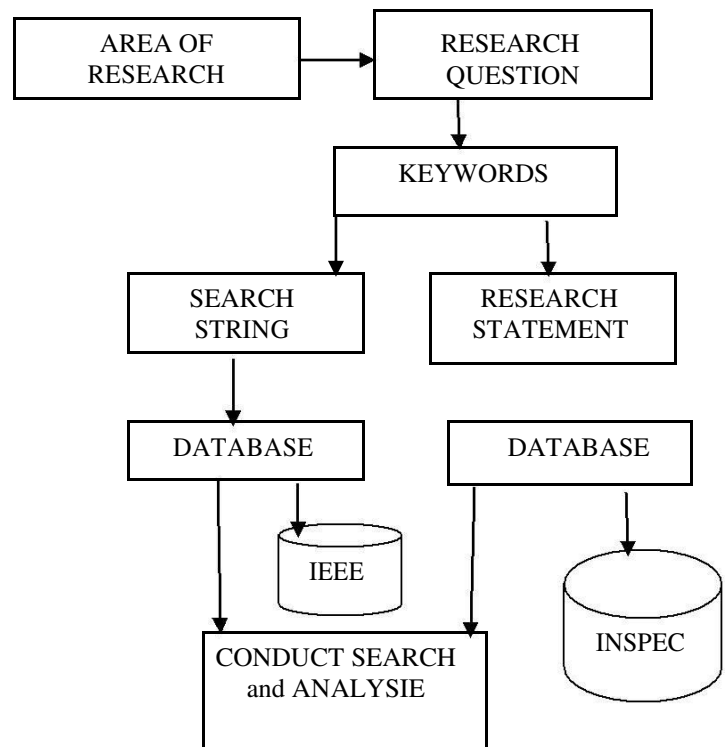
Include/exclude criteria:

Include study criteria is based on:
- Studies that are made in between 1990 and 2015
- Studies that are made in English
- Studies that have the full text access eligibility

  Studies that are related to team work, resource management, product management.
- Studies that are related to journal articles and related to IEEE papers.
- Studies that are directly related to work
- Studies at one stage were made on only challenges of HRM(IEEE)

Exclude study criteria is based on:
- We did not focus on the area of software under enterprise or business side i.e.., growth of firms only concentrated on the challenges they face not business point of view.
- We did not focus on the health systems, other government systems, private textile industries not related other than to software sectors.
- We did not focus on the articles that don't deal with software industry and Information technology.
- Studies that don't focus on project team management and focus on some other issues in the software industry.

Quality assessment Criteria:
Quality based on quantitative criteria:
    QSC1   Whether the aim of the article is clearly stated?

    QSC2   The measurement outcomes were unbiased?

    QSC3 Whether the survey and analysis of data for research clear?

Quality based on Qualitative criteria:
    QSC4 For minimum quality requirement basis how well was the data collection process done?
    QSC5   Is the level of clarity and coherence and consistency maintained in report?
    QSC6   How well is the documentation done using the research process?

The quality assurance for the primary study assessment is assessed as follows:

Quality assessment criteria	Response score
QSC1	Yes/No
QSC2	Yes/No
QSC3	Yes/No
QSC4	Strong(s)Weak(w)
QSC5	Strong(s)Week(w)
QSC6	Strong(s Week(w)

The below table helps in assessment of quality score for each study in primary study by using above table:

Primary Study	QSC 1	QSC 2	QSC 3	QSC 4	QSC 5	QSC 6
Ref[2]	YES	NO	YES	S	S	S
Ref[7]	YES	YES	YES	S	W	S
Ref[6]	YES	YES	NO	W	W	S
Ref[8]	YES	YES	YES	S	S	S
Ref[5]	YES	YES	YES	S	W	S
Ref[4]	YES	YES	YES	S	S	S
Ref[1]	YES	YES	YES	S	S	S
Ref[9]	NO	YES	YES	S	S	S

    We applied the quality assessment criteria for interpretation purposes and utilize them for the research studies by strengthening the interfaces where they are applicable.

Validation of Protocol:
    The whole search strategy used the same recorded document for quality assessment criteria.
Then the final results were performed on the Microsoft word document on Macintosh System for our literature review. The results we obtained are trust worthy as they say about challenge of HRM. Out of 24 papers 7 papers are trustworthy, that should be included in the literature review also some handpicked conference publications were used in our final evaluation results. They are genuine once to look into for challenges in HRM in software industry.

Data Extraction Process:
The below table explains what type of data that is challenge type that is extracted from different selected papers which were obtained in the primary study:

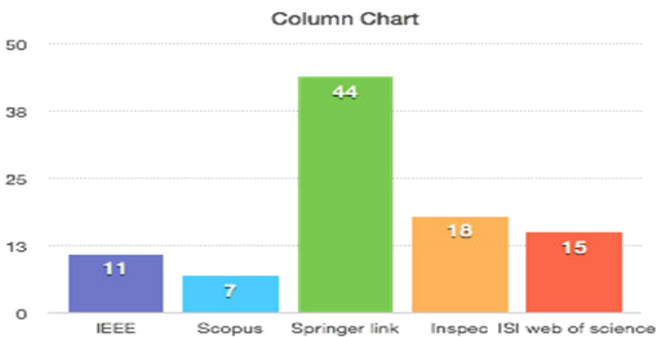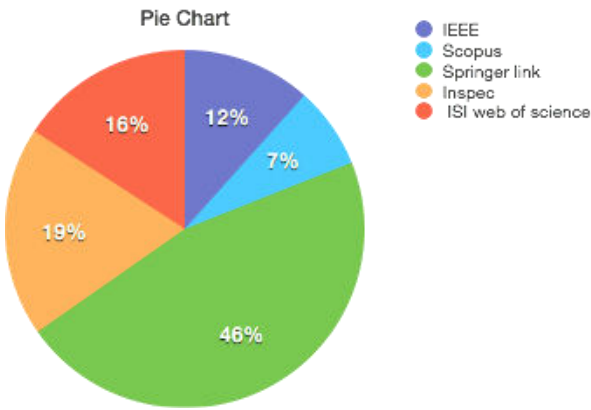| Papers that are selected to do the research	Impact of data from paper review High (H);Low(L)	We were interested in challenges that are found in each paper to extract data.
REF[2]	L	Is there a need for Human workforce.
REF[3]	H	Is training not that important for performance in an industry
REF[7]	H	Does Labor shortage has no effect in development
REF[10]	H	Is there any impact if Challenge faced due to cultural insensitivity.
REF[8]	L	Challenges of usage of tools and its impact either positive or negative in firms.
REF[9]	H	Does Improper work distribution has effect on the employees.
REF[4]	L	No necessary of task coordination for completion of project
REF[5]	H	Unstructured IT teams are advantages.

We used the Macintosh PAGES and KEYNOTE and for diagrams and Tables and NUMBERS in order to conveniently store and use the data for our research question and also the form we used for quality assessment is also written in pages. The appended 7 papers from which the following key result are extracted from and further the necessary word documentation is done on those papers.

INCLUDED AND EXCLUDED STUDIES:
    After appending all databases results by the Inclusion /exclusion criteria in order to get the relevant Information by consolidating according to 7 papers related for the literature review.

Column and bar graph compare values in a side category, such as number of available records.

Publications	No of Records
IEEE	11
Scopus	7
Springer Link	47
INSPEC	13
ISI web of Science	15

Pie Chart

- IEEE
- Scopus
- Springer link
- Inspec
- ISI web of science

12% 7% 16% 19% 46%

Column Chart

IEEE 11, Scopus 7, Springer link 44, Inspec 18, ISI web of science 15

THE INCLUSION EXCLUSION CRITERIA:

The following table represents the criteria for exclusion and the number of excluded criteria and also the reason or rationale behind the exclusion of the articles.

Total number of Exclusion criteria for Inspec database	Reason or Rational of Criteria
344	Papers that include all the topics and sub divisions
18	Inclusion based on full text and also exclude the language other than English.
4	The relevance of HRM to the product and team working perspective challenges in software firm

For better representation the following flow diagram is used in order to understand how the refinement search criteria is made for our search process.
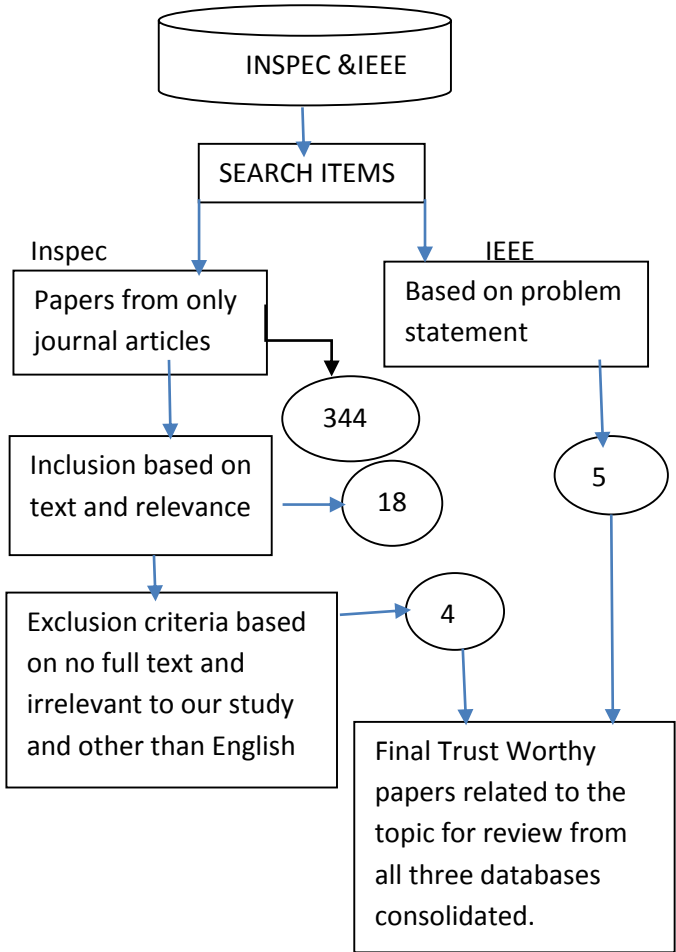
RESULTS:

Primary Study	Challenges or Drawbacks that are observed and deduced.
REF[2]	Human factors are not that important, lack of vision in who is responsible for what work to be done.
REF[3]	No necessary in use of the Skilled trainers in development or training process.
REF[7]	There is lack of labor effect to complete work in time, projects pending due to employee for specific work are not available in market.
REF[10]	Teams that are culturally insensitive necessary effect which should be mitigated.
REF[8]	The tools are necessary for any work along with Human workforce but challenges are faced in small scale firms where budget constraints.
REF[9]	Work distribution criteria always considered but due to micromanagement the employee either equal distribution or work overload.

REF[5]	Unstructured IT team lead to no proper managing and HRM is unable to properly plan for cases like new projects.

Research Questions:

RQ1) What are the challenges faced by HRM in project Oriented software Product development and software services Firms?

DISCUSSION: The HRM is one of the important entity in software product and service firms. The HRM faces challenges at different levels of development life cycle and these challenges are mainly project oriented.
 To support our synthesis of data, that there are challenges at various level in HRM, which is observed through information from various papers, which support that challenges are present in HRM and the need to reduce them for better quality outcomes.
In [2], the workforce is very essential in software firms. Even though there is immense workforce no proper utilization is done. Sometimes the decisions are entirely based on product Managers as they are key in taking decisions irrespective of others viewpoints.
According to author In [3], the challenges faced if there is improper training and no skilled employee is established for training which effects the performance, vision of the employee towards development.
 In [5], the challenges are faced for new projects due to shuffle of IT team members which effect in two ways one it effects their own team and also the new team due to both face the unstructured IT team and due to improper management deadlines are not met in time.
IN [6], the challenges faced because of cultural imbalance in IT teams which comprise of people from different countries and communities who may show disrespect towards other culture and supremacy.
In [7], challenges occur due to shortage in employee and even if the employee is available they are not given the desired work, they can be capable of rather some other work distribution. This work is hard to complete by the employee as he is unexperienced or not trained for that work assigned.

RQ2) What are the Mitigation strategies for cultural and behavioral challenges that are handled by HRM?

DISCUSSION: The cultural challenges are usually thought between those who are from various countries. Our synthesis show that there are really cultural and behavioral challenges that effect the firms.
 According to author in [5], for any software firm development if cultural differences unresolved the coordination in task disrupted. The culture effects the organization and managing of projects which in turn impact the HRM in proper resource mobilization.
IN [6], team members for example when they are in a conference with other country delegates they must understand what or whom they are facing, how to negotiate with them, what to speak, what not to, how to behave and what are the barriers in behaving over the other cultural if not followed it effect other culture diversity and lead to insensitive space between team staff.
 In [10], someone must take responsibility to reduce miscommunication and accept the other cultural views, belief over understanding a problem statement their ability to solve

them, the way they understand the problems, help in reducing the ineffective task environment.
In [6], behavioral aspects also have some common challenges in the HRM like if a person behaves improperly and removed the valuable information might leak also if he not following right IT practices, not obey others viewpoints and suppress them to surpass illegally also the challenges that are to be controlled by proper advices.

RQ3) What are the challenges faced by software industry and also HRM when employee turnover and also in work distribution strategy failure?
DISCUSSION: The employee dropout of company when he understands his contribution to the development is nil.
In [4], the pressure on the employee in problem and task solving is increasing due to external competitive world impact thus leads to employee quit the jobs due to no proper retention strategies to improve better work distribution.
Firstly respect to individual work and recognition if its good and uniform distribution over all the employee including leader he must be ready to face any challenge when team does anything wrong and take the mistake on himself and give the awards and credits to the members when they succeed helps every team structure to be strong and respect their environment.

VII.   DISCUSSION

From the analysis of the results, we found that there are challenges at various levels which are caused due to deviation from the required strategy. Our study is based on understanding the challenges of HRM. Every software firm have their own mitigation strategies for compensating the challenges. Our work mainly focuses on whether there are challenges in the HRM,

- Are all of them addressed?
- Were they really witnessed in real life?
- If witnessed, what mitigation strategies are being used compensate the challenge?.

The mitigation strategies used are the ones proposed by the researchers in their papers to effectively reduce the challenges by following some protocols.

As observed from the literature review it is proved that only few challenges that exist in real life HRM and concrete mitigation strategies are also proposed to reduce them. This review provides controlled solutions as the collected data is unbiased and taken from trustworthy papers.

Strength: The research based mitigation strategies to the concerned challenges should be practiced by the industry in the real scenario.

Weakness: Bias of the belief in the HRM industrial practitioners who look at the challenge based on individual solver techniques.

 Opportunity: It helps to identify the challenges in real world scenario and the new ones the industry is going to be prone to.

Threats: Finding solutions to the new challenges and steps to be taken if the proposed strategy does not give expected results.

The overall development of a company is linked with the magnitude of importance and direction given to HRM. Effects like low market value, decrease in trust over company's performance degradation, loss of valuable staff are the risks to be faced. To avoid these challenges it is better to completely depend on the proposed strategy as they provide better results.

VIII. LIMITATIONS

Limitations occur as the data provided is incomplete. Sometimes Interpretation on may go wrong in qualitative research and it's necessary to justify the steps followed.
Dependent variable: success rate of product quality.
Independent variable: Violation of Human resources.

To reduce these threats we can use reflexivity like limitations in potential role conflicts, lack of neutrality. Anything new or surprising in our data collection will be a limitation to rectify and so the case studies and surveys help a lot for qualitative research. We can use Triangulation to reduce its effect.

There is no governing body that survey on, whether all the firm members at any level are following their own paper work or the standard that had to be followed to avoid the challenge occurrence.

In real life industrial practitioners perspective they have their own challenge solvers strategies that are merely useful to some extent but highly hard to solve entire challenge riddle convincing them need some qualitative data.

IX.CONCLUSION

The main finding of the review is focused on recruitment, training, discrimination of employee values which are very important and need to be addressed by HRM for proper resource management and best outcomes can be achieved if all the above criteria are met.

Our findings show that the software development under HRM versus administration affects the productivity and quality. There is chance for improving alternate solutions in looking into mitigation strategies for refinement which is upcoming scope for continuing research in this area. The quantitative effect of HRM in case of following the standards predefined is not answered in the review.

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