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# A DISCUSSION ON THE ROLE OF PEOPLE IN GLOBAL SOFTWARE DEVELOPMENT

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Preliminary notes
Literature is producing a considerable amount of papers which focus on the risks, challenges and solutions of global software development (GSD). However, the influence of human factors on the success of GSD projects requires further study. The aim of our paper is twofold. First, to identify the challenges related to the human factors in GSD and, second, to propose the solution(s), which could help in solving or reducing the overall impact of these challenges. The main conclusions of this research can be valuable to organizations that are willing to achieve the quality objectives regarding GSD projects.

***Keywords:*** *global software development, people management, software industry, People CMM*

## Rasprava o ulozi ljudi u globalnom razvoju softvera

Prethodno priopćenje
U literaturi se može naći priličan broj radova koji se bave rizicima, izazovima i rješenjima za globalni razvoj softvera (GSD). Međutim, utjecaj ljudskog faktora na uspjeh projekata o globalnom razvoju softvera zahtijeva dodatno istraživanje. Ovaj rad ima dvojak cilj. Prvo, identificirati izazove povezane s ljudskim faktorima u GSD i, drugo, predložiti rješenje (rješenja) koje bi moglo pomoći u rješavanju ili reduciranju cjelokupnog djelovanja tih izazova. Glavni zaključci ovog istraživanja mogli bi biti važni organizacijama koje žele postići kvalitetne rezultate projekata koji se bave globalnim razvojem softvera.

***Ključne riječi:*** *globalni razvoj softvera, upravljanje ljudima, softverska industrija, People CMM (People Capability Maturity Model - Model osposobljavanja ljudi)*

## 1 Introduction

Software development from A to Z is rarely the result of one person's work only. Today, software development is a team work. Furthermore, with the booming of the Internet and the adoption of electronic communication systems, the semantic of this team work has become more and more important. As defined by Sangwan et al. [1], global software development (GSD) is the development of software through teams, from multiple geographic locations, that may pertain to the same organization or to other collaborating companies.

GSD teams have evolved from a single site to a multiple localization working environment [2]. As a result, firms developing and/or maintaining software products cannot ignore the impact of GSD [3], since it is driving a deep transformation in the way that products are conceived, designed, constructed, tested, and delivered to customers [4]. The final result of this process is that software development is becoming a multi-site, multicultural as well as globally distributed undertaking (e.g. [5, 6]). Although GSD is a de facto tendency in today's IT industry, sometimes it is criticized for being slow and hindering. In spite of this, nowadays software products are developed collaboratively in multiple locations around the world. Projects are being contracted in whole or in part [7] with several motivations, including the desire of being close to local markets. However, this motivation is not enough to enable GSD to work as fast as traditional team work, where everyone is in the same building. One of the most recognized benefits with regard to the adoption of e-communications is that, as long as employees are connected, they can work no matter where they are. However, an empirical study by Herbsleb and Mocus [8] reported that a distributed setting can take 2.5 times longer to do similar tasks when compared to a non-distributed setting. It is so because GSD may be contradictory to agile development, a widely accepted practice in software developments. One of the reasons for the success of agile developments is that people are placed closer together, so that teams can be more effective. This practice reduces the cost of moving information, employees can talk, discuss and solve problems immediately [9]. In contrast, GSD places people around the globe and, therefore, the agility goal is hardly achieved. Although agile development cannot be set up along the entire project the nodes of software development centres could adopt it.

The importance of GSD management has led to a huge effort in the art and science of organizing and managing globally distributed software development. However, there is still a need for further research regarding the development of methods, techniques and practices before GSD can be considered a mature discipline [10], since the globalization of software development introduces a great deal of complexity in an already complex process [11].

Human resources management is a key issue in any software development project, including GSD projects [12]. The importance of human resources in software engineering was confirmed more than a decade ago, when Software Engineering Institute (SEI) developed a separate model for personnel management: the people management capability maturity model (PM-CMM) [13]. More recently, several studies have been devoted to shed some light into people management aspects and GSD environments [14 ÷ 21]. In this complex scenario, the aim of this paper is double. Firstly, it is aimed to identify the challenges related to the human factors in GSD and, secondly, to propose the solution(s), which could help in solving or reducing the overall impact of these challenges.

The remainder of the paper is organized as follows.