Metrics for the Management of IT Personnel: A Systematic Literature Review

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ABSTRACT
This article describes how because of the ongoing demographic development in most European countries, especially IT-companies, need to find a way to retain or gain productivity with the same or less amount of employees. Therefore, the allocation of available resources in the best possible way is even more important. The challenge for companies is to improve the enterprise not only on the side of the organizational and process level, but to develop new strategies and approaches in human resource management. In this article, the authors propose metrics of a framework to manage scarce resources in IT-departments. These layers aim for different relevant determinants of employee productivity and satisfaction like employee wages, education of employees, psychological development of employees, workplace environment and work life balance. Also, relevant metrics to explore and use untapped labour potential in organizations are included. The use of these metrics provides a valuable insight into the organizational performance, its culture, and future. A company can measure the actual status, recognize potential threats, and derive measures to retain productivity in the upcoming years.

KEYWORDS
Demographic Development in Europe, Employee Productivity, Human Resources, Information Technology, Scarce Resources, Shortage Of Skills

1. INTRODUCTION
The skill shortage is becoming an ever-increasing challenge for every industry and even more for IT departments, given that IT is personnel-intense. Therefore, the allocation of these scarce resources in the best possible way is even more important. The challenge for organizations is to increase the company not only on the side of the organizational and process level, but to develop new strategies and approaches in human resource management. Only a symbiosis of the disciplines information technology, economics and psychology will enable relevant and indispensable employees to promote loyalty to the company. For a well-trained professional, frequent change of the work place, is as long associated with normality until they find the most suitable environment for fulfilling their needs and expectations. These are no longer just based on aspects as financial incentives (Institute for opinion survey Allensbach, 2014). Consequently, companies need to anticipate these expectations and align their strategies to them. To achieve that, these expectations need to be quantified on an organizational level.

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2. DERIVATION OF METRICS FOR A FRAMEWORK TO MANAGE SCARCE RESOURCES

2.1. Search Strategy

The research strategy follows the model of the structured literature review. It includes search terms, literature resources and search process, which are detailed one by one in the following paragraphs:

The search string has to be defined based on the population under study, and the keywords and their synonyms. Therefore, the study population includes the relevant keywords from all five layers of the proposed framework.

With this population the list of keywords and their synonyms, used to generate the search string was:

- Employee wages: employee salary
- Education of employees: education of personnel, untapped potential in organizations
- Psychological development of employees: psychological changes of employees
- Workplace environment: workplace optimization, workplace development
- Work life balance

To generate the search string a Boolean language with AND and OR, and quotation marks for exact text were used. The string format is recognized by all sources of information used, as well as many others. So finally the search string used is as follows: (“employee wages” OR “employee salary”) AND (“education of employees” OR “education of personnel” OR “untapped potential in organizations”) AND (“psychological development of employees” OR “psychological changes of employees “) AND (“workplace environment” OR “workplace optimization” OR “workplace development”) AND (“work life balance”). Given the variety of sources to be consulted electronically via the web, five electronic databases of established literature resources were used for the present SLR. This systematic review considers the following list of sources:

- IEEE Digital Library (http://ieeexplore.ieee.org),
- ACM Digital Library (http://portal.acm.org),
- SpringerLink (http://link.springer.com),
- IDEAS Digital Library (http://ideas.repec.org/) and
- ScienceDirect (http://www.sciencedirect.com/)

The SLR was conducted in the following way: at first, the named digital libraries were searched according to the defined search items for relevant publications. Second, the publications found were reviewed by title and abstract in order to estimate their relevance for the topic. After that, a full text review was conducted which leads to a set of primary studies. Fourth, the primary studies were reviewed whether there are references to other publications with other relevant papers to this topic. This process can be seen in Figure 1.

The data extracted from each paper was documented and kept in a reference manager. After identification of the papers, the following data was extracted:

- Source (journal or conference)
- Title
- Authors
- Publication year
- Classification
- Summary of the research, including which questions were solved
TRAILER: A Tool for Managing Informal Learning
Clara Viegas, Maria Marques, Gustavo Alves, Aleksandra Mykowska, Nikolas Galanis, Marc Alier, Francis Brouns, José Janssen, Francisco J. García-Peñalvo, Alicia Holgado, Valentina Zangrando and Miguel Ángel Conde-González (2014). *International Journal of Human Capital and Information Technology Professionals* (pp. 1-17). [www.igi-global.com/article/trailer/117570?camid=4v1a](www.igi-global.com/article/trailer/117570?camid=4v1a)

Identification of Patterns for the Formation of Software Development Projects Teams
Margarita André Ampuero, María G. Baldoquín de la Peña and Silvia T. Acuña Castillo (2010). *International Journal of Human Capital and Information Technology Professionals* (pp. 69-80). [www.igi-global.com/article/identification-patterns-formation-software-development/46083?camid=4v1a](www.igi-global.com/article/identification-patterns-formation-software-development/46083?camid=4v1a)
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A Bridge to the Workplace: Using an Internet-Based Simulation in the Writing Classroom
[www.igi-global.com/chapter/bridge-workplace-using-internet-based/24691?camid=4v1a](www.igi-global.com/chapter/bridge-workplace-using-internet-based/24691?camid=4v1a)