Coverage of 'human factors' in project management literature: a systematic journal review

Abstract

Researchers of project management over the last 20 years have published multiple significant reviews that have served to map the landscape of project management, revealing its complexity and deepening our understanding. Contributing to this understanding is an ongoing challenge, and one dependent on the timely identification of topics that reveal truths and propel practice. This paper contributes to this understanding through a systematic review of more than 1100 journal articles published in the last 5 years on the theme of the 'human factors' of project management that reveals their multiplicity, distribution and focus. The article will conclude with directions for future research.

1. Background

This review is part of a larger research effort that started approximately 2 years ago in the Netherlands. Awarded the responsibility of hosting the 2014 IPMA World Congress in Rotterdam, the Dutch organizing committee announced 'Innovation through Dialogue' as the conference theme with a focus on human factors in the academic and research stream. (The promoted topics were attitude, acceptance, commitment, credibility, creativity, ethics, leadership, nurture, personal development, trust, well-being and willingness.)

The Dutch National Research Group (DNRG) was formed to promote this theme nationally and encourage the contributions of Dutch researchers active in this area. The first step of which was the National Workshop Series (inspired by the Rethinking Project Management project (Winter et al, 2006)—a series of eight workshops held at different universities across the Netherlands. Each event focused on one topic and pairs of researchers and practitioners presented on the topic. Attendees (more than 220 from 79 different organizations) then participated in a World Café where they were asked to discuss the topic indepth in response to four primary research questions. Figure 1 illustrates the path of DNRG and where this review supports it. It is a key step along this path, one goal of which is to contribute to the increasingly detailed landscape of project management research with 'human factors' as the central theme.

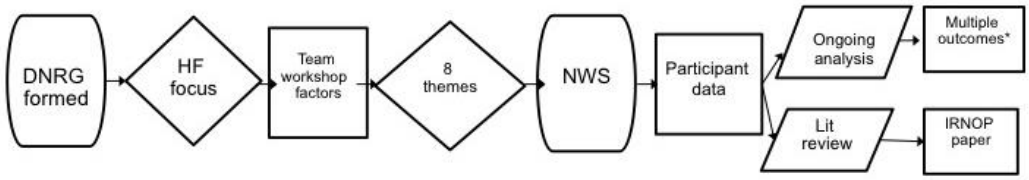

Figure 1: Research path of the Dutch National Research Group

2. Methodology

To demonstrate that support, this literature review explores the characterizations of and topics associated with the broader subject of 'human factors' in project management journal literature. It is offered as a literature review consistent with the most recent characteristics identified by the APA (2010), which defines such reviews as 'critical evaluations of material that has already been published' (p.10). As its authors, we are 'evaluating previously published material and considering the progress of research toward clarifying a problem' (p. 10). And by focusing on the very specific language used by previous authors in this domain, we aim for consistency with Hart (1998) who explains that 'by acquiring sufficient knowledge of the subject area…the knowledge can serve the purpose of providing a perspective on how the subject has developed and became established, and assist in the development and acquisition of appropriate vocabulary." (p. 27)

It is to this last point—concerning the development of 'appropriate vocabulary'—that this literature review directly contributes. But first, an explanation of the process of identifying the factors themselves.

1. As a starting point, the team had the terms associated with Pasian (2011) as part of her examination of project management maturity and associated models. In it, she identified 'human factors' as an organizational dimension that was necessary to achieve reliable but flexible project management capability. The following factors were identified: *acceptance, attitude, commitment, loyalty, motivation and trust*.
2. A brainstorming session with the DNRG team generated a longer list (including the Pasian factors) composed of: *acceptance, attitude, burnout, change, commitment, creativity, credibility, devotion, ethics, identification, leadership, motivation, nurture, trust, well-being, and willingness*.
3. This collection was distributed to 800 participants at a series of project management events in late 2013 with more than 250 respondents providing feedback. Their responses were consolidated and ranked in frequency to a total of 15.

4. For the purposes of designing DNRG's National Workshop Series (NWS), the list of 15 were reduced to 7 with an additional one (personal development) suggested by researchers from a specialized college whose curriculum is entirely project management. The final list of 8 topics was: *trust, collaboration, creativity, motivation, personal development, leadership, well-being and attitude*.
5. Based on the input of the 220 participants of the NWS who, through their registration form, workshop participation and evaluation document generated 53 new factors were generated. This initial list was broadened based on the surveys held among the 220 attendees of the NWS. Out of the answers 118 respondents gave to four general questions on the respective NWS themes 53 new factors were generated. .
6. The combination of these 53 factors and the initial list of 15 served as the basis of this literature review.

Research questions

As this is the first literature review on this theme reflecting human factor coverage in project management research, the authors are answering the following research questions:

- What attention have past reviews of project management research given to 'human factors?'
- What specific characterizations have been given to 'human factor' perspective in journal articles in last five years?
- What comparative coverage have these factors received in project management journals?
- What initial broader categorizations can be made to aid in the development of 'appropriate vocabulary?'

3. Previous works

Project management research has been mapped by multiple reviews in the last 20 years using journal articles as the basis for their reviews. Even in the last few years, as literature reviews have become more focused on major specific themes and more extensive in the depth of data gathering, surprisingly the term 'human factor' has been used rarely and even when it was it was often in **r**eference to Betts & Lansley (1995).

Using an a priori classification of the publications based on the Betts & Lansley 'human factor' definition, we have chosen to use them as a starting point in our review of the literature and have presumed that subsequent researchers considered them in their reviews. Moreover, the phrase 'literature review' was used as a search criterion in the title for articles

where a specific topic was the focus. Table 1 shows how this (could have) occurred and where other topics were identified / emphasized.

Table 1: 'Human factor' coverage in past literature reviews

Source	Focus	Main text reference to 'human factor(s)'	Specific characterizations *
(Betts & Lansley, 1995)	Content review of IJPM	Discussed as one of many themes in prior 10 years of IJPM articles	Safety, productivity, motivation, leadership, creativity, recruitment, teamwork, education, training
(Themistocleous & Wearne, 2000)	Project management topic coverage in journals	None	None
(Henrie & Sousa-Poza, 2005)	Project management: a cultural literary review	None	None
(Rozenes, Vitner, & Spraggett, 2006)	Project control: a literary review	None	None
(Crawford, Pollack, & England, 2006)	Uncovering the trends in project management: Journal emphases over the last 10 years	1 reference in main text to Betts & Lansley	None
(Carden & Egan, 2008)	Does our literature support sectors newer to project management? The search for quality publications relevant to nontraditional industries.	None	None
(Kwak & Anbari, 2009)	Analyzing project management research: Perspectives from top management journals	None	None
(Turner, 2010)	Evolution of project management research as evidenced by papers published in the International Journal of Project Management	None	None
(Littau, Jujagiri, & Adlbrecht, 2010)	25 years of stakeholder theory in project management literature (1984–2009).	None	None
(Pasian, 2011)	Project management maturity and associated models	Yes	
(Savolainen, Ahonen, & Richardson, 2012)	Software development project success and failure from the supplier's	None	None

	perspective: A systematic literature review		
(Lehtiranta, 2014)	Risk perceptions and approaches in multi-organizations: A research review 2000–2012	None in text	1 reference to 'human risk factors'
(Taroun, 2014)	Towards a better modelling and assessment of construction risk: Insights from a literature review	1 reference in main body	intuition, professional experience and personal judgment (for risk assessment)
(Müller, Pemsel, & Shao, 2014)	Organizational enablers for project governance and governmentality in project-based organizations	None	None
(Mok, Shen, & Yang, 2015)	Stakeholder management studies in mega construction projects: A review and future directions	None in main text. 1 reference to 'human factors' (Deegan & Parkin, J., 2011)	None
(Svejvig & Andersen, 2015)	Rethinking project management: A structured literature review with a critical look at the brave new world	None	None
(Cameron, Sankaran & Scales, 2015)	Mixed Methods Use in Project Management Research	None	None

*These are either uses of the Betts & Lansley (1995) classifications or similar variations.

There has been no attempt to build directly on the Betts & Lansley characterizations or explore these 'human factors' indepth in literature review articles. Dozens of articles have been published using those characterizations (and many others, as will be shown below) but not included in broader discussions or been the focus of reviews looking at (or related to) those characterizations. Reasons for this are unclear.

4. Analysis: Frequency of topics

The analysis shows us that certain human factor topics have received more attention than others. We have been able to discern a top 20 of topics receiving the most attention, as is shown in Table 2. Standing out by far is the topic of *knowledge*. This topic is covered in many ways, such as *knowledge sharing* (Arroyo & Walker, 2010; Han & Hovav, 2013; Pemsel & Wiewiora, 2013; Ding, Ng & Li, 2014), *knowledge transfer* (Bakker e.a., 2011; Rezania & Ouedraogo, 2013), *knowledge-intensity* (Lindner & Wald, 2011), *tacit knowledge* (Suhonen & Paasivaara, 2010) and *knowledge integration* (Dietrich e.a.,2010). The topic is often (25 times) mentioned together with *learning*, being the activity leading to knowledge.

Table 2: Top 20 most frequently identified HF

	Top twenty of HF topics in PM-journals			
	Total	IJPM	PMJ	IJMPB
knowledge	92	42	21	29
social	68	29	10	29
culture	62	28	10	24
behavior	58	25	17	16
communication	57	27	11	19
learning	54	25	7	22
leadership	48	22	12	14
perception	44	21	10	13
trust	41	21	4	16
competence	40	20	13	7
conflict	38	19	8	11
change	37	17	7	13
collaboration	36	19	7	10
interaction	34	9	5	20
understanding	34	14	1	19
commitment	27	12	5	10
skill	25	8	9	8
expectation	23	13	3	7
politics	23	8	3	12
motivation	22	14	3	5

The two more general notions of *social* and *behavior* relating to human factors are also high on the list. They are associated with projects in several ways. As an adjective *social* points to many human aspects of projects, like *social capital* (Gustafsson e.a., 2010; Han & Hovav, 2013; Hsu e.a., 2013), *social skills* (Alam e.a., 2010; Skulmoski & Hartman, 2010;) or even *social risk* (Shi e.a., 2014). The topic of behavior sometimes appears in association with certain project roles. For instance, articles have been found on *project owner behavior* (Andersen, 2012) and *stakeholder behavior* (de Bakker e.a., 2010). Others focus on certain types of behavior, like *collaborative behavior* (Clarke, 2010), *opportunistic behavior* (Laan e.a., 2011) and *organizational behavior* (Chiocchio & Hobbs, 2014).

In the top twenty there are also some striking differences in attention between the journals. For some reason the topic of *trust* did not receive much attention in PMJ (4 references) in

comparison with IJPM (21 references) and IJMPB (16 references). Four out of eight NWS themes appear in the top twenty, namely *leadership*, *trust, collaboration* and *motivation*. This indicates these NWS show alignment with recent research efforts in project management. Other NWS themes are showing less references in the journals: *attitude* (21), *creativity* (16), *well-being* (4), *personal development* (2).A few of the topics didn't appear at all in this five year search: credibility, devotion, followership, happiness and nurture.

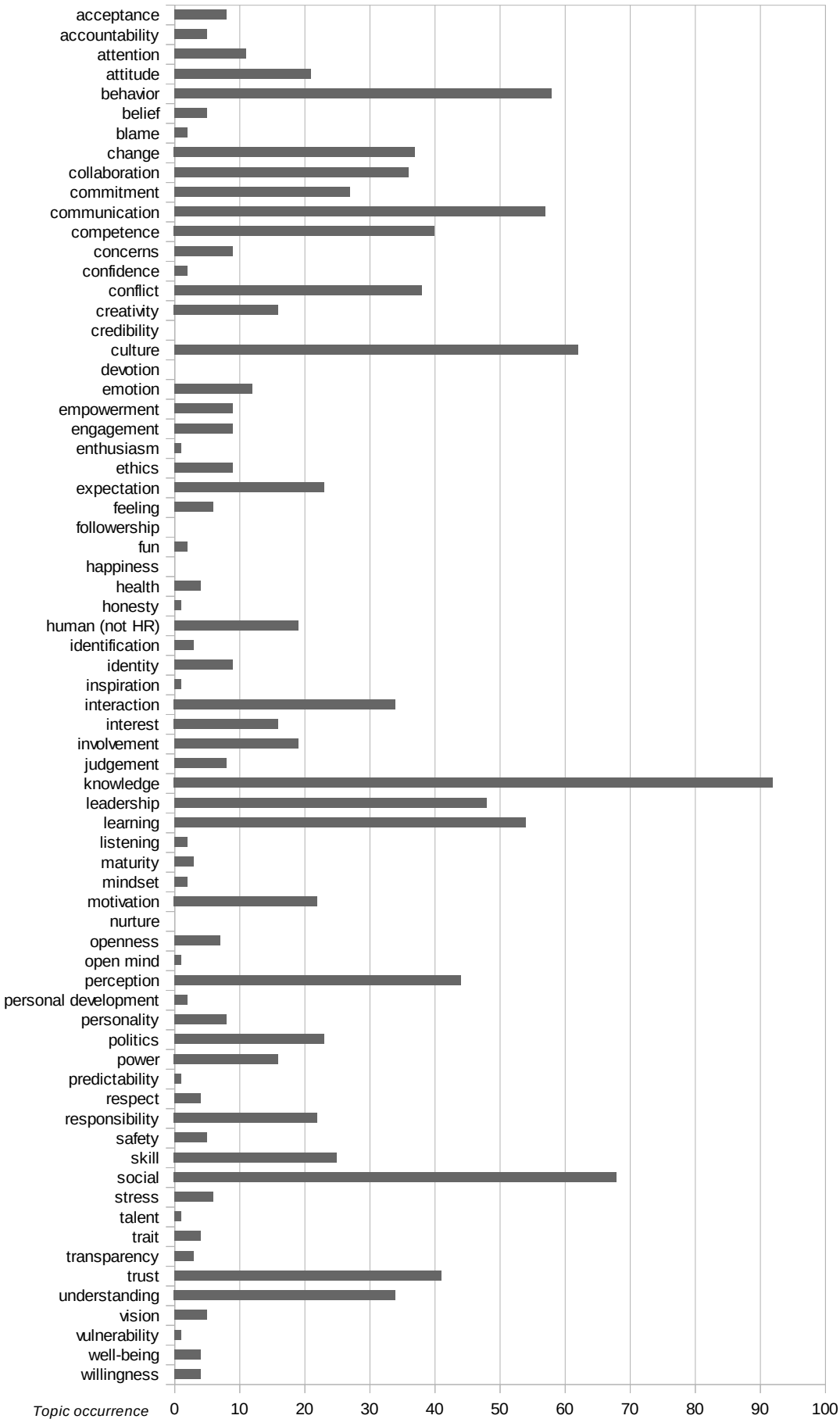

Figure 2: Topic distribution of articles 2010-2014

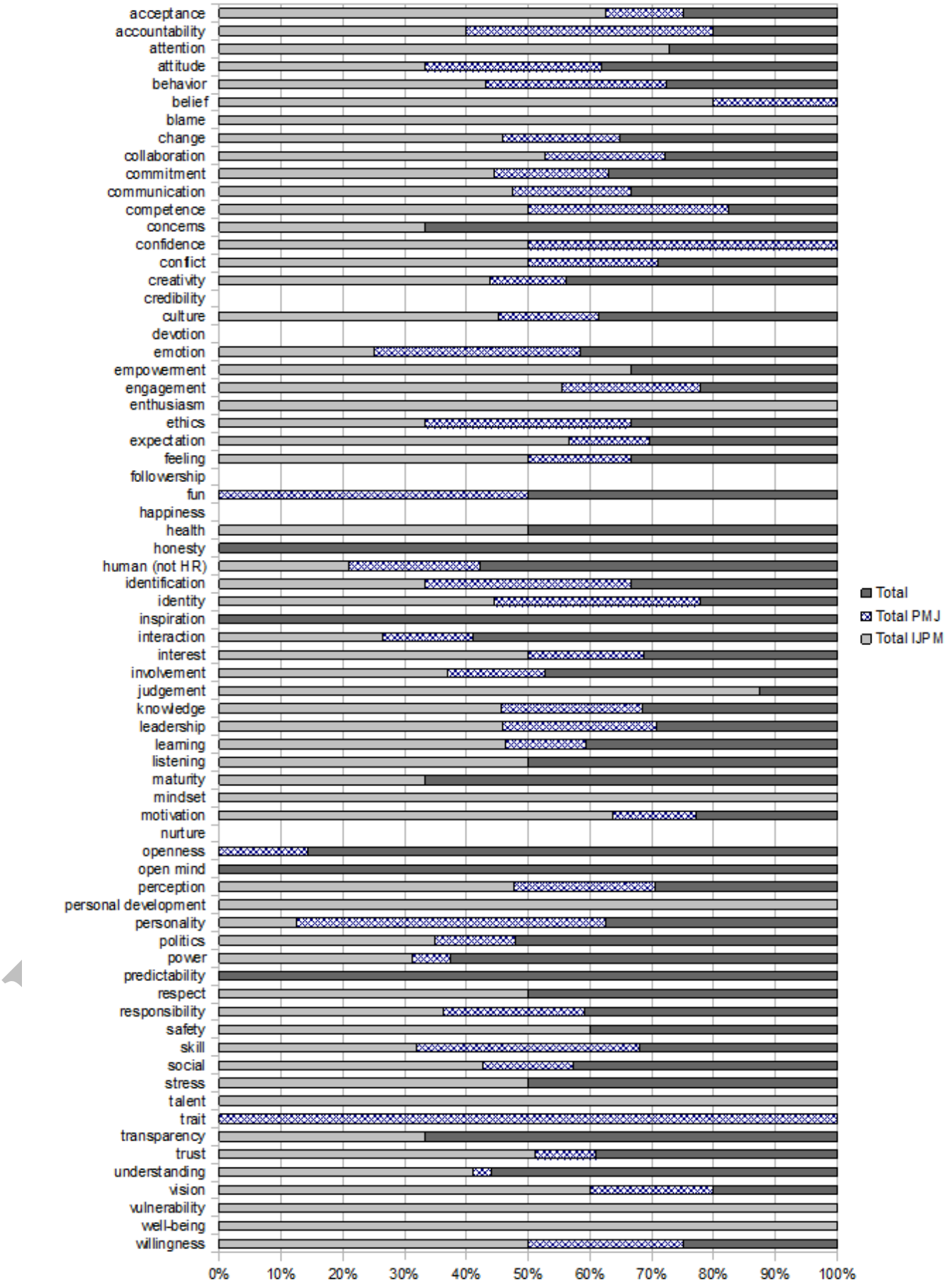

Figure 3: Stacked distribution of topics across journals

Comparison of articles

The first step in the more detailed analysis we took was to search titles, keywords and abstracts as preliminary information sources (Teddlie & Tashakkori, 2009) using the complete list of keywords. More than 1100 articles were generated published by the International Journal of Project Management (IJPM), Project Management Journal (PMJ) and the International Journal of Managing Projects in Business (IJPMB) in the last five years. The keyword search initially generated a list of 728 articles. An analysis of the abstracts revealed that not all of the findings actually referred to a human factor topic in project management, as becomes clear from the following example:

> "As a substantive contribution to **knowledge** the research defined project quality with three dimensions (viz. Design Quality, Process Quality and Organisation Quality) and **identified** the lack of **attention** to details to Organisation Quality." (Basu, 2014)

In this quotation "knowledge" refers to an abstract scientific body of knowledge instead of the knowledge present within a project context. "Identified" refers to a research activity and "attention" is associated with attention of researchers to a certain topic.

It became clear that the use or consideration of each factor differed considerably. We needed to categorize the papers based on our factor collection. In their systematic review of networking and innovation literature, Pittaway et al (2004) distinguished articles into A, B, and C types depending on the relevance of the empirical approach to research articles. Guided by this, we created a similar typology (see Table 3).

Table 3: A-B-C article typology

Type	Explanation
A	The article clearly focuses on the HF in a project management context
B	The HF was used to support / illustrate a project management issue that was the central focus of the article.
C	The HF language is used but its meaning / association is not clearly in a project management context / purpose.

First we narrowed down the amount of 728 articles by establishing if the keywords found in the article were actually referring to human factors in a project context in the way described above. The articles that didn't were identified as C list articles. This exercise left us with 490

articles that were in some way referring to our theme. Fur purposes of further analysis it was necessary to make a distinction between articles with a main focus on our theme (A list) and articles mentioning the human factor, but in a different context (B list).

On the basis of our A-B-C typology, the literature review generated the results seen in Table 4 where the articles of all types are quantified against the total articles published in that journal. Aside from the total number of articles published, the only consistent increase can be seen in Type-B articles which, as a total, represent 22.3% of all articles published in this 5-year period. Combined with the 20.2% of Type-A articles, 42.5% of all articles in this period include at least one of the factors identified in Figure 2. Moreover, the total number of articles has increased from 194 in 2010 to 299 in 2014 (increase with 54%), whereas the amount of articles referring in some way to our set of topics is more or less stable between 85 in 2012 and 108 in 2014. Figure 5 shows a fuller illustration of the percentage breakdown of articles per journal per year.

		A-list	B-list	C-list	rest	Total
2010	IJPM	30	13	19	30	92
	PMJ	11	11	14	30	66
	IJMPB	16	13	7	0	36
	Total 2010	**57**	**37**	**40**	**60**	**194**
2011	IJPM	28	25	30	26	109
	PMJ	10	9	10	37	66
	IJMPB	19	6	13	0	38
	Total 2011	**57**	**40**	**53**	**63**	**213**
2012	IJPM	12	23	18	44	97
	PMJ	8	16	7	41	72
	IJMPB	13	13	18	0	44
	Total 2012	**33**	**52**	**43**	**85**	**213**
2013	IJPM	26	26	23	38	113
	PMJ	12	13	3	42	70
	IJMPB	12	19	18	0	49
	Total 2013	**50**	**58**	**44**	**80**	**232**
2014	IJPM	19	45	36	95	195
	PMJ	11	13	7	40	71
	IJMPB	6	12	15	0	33
	Total 2014	**36**	**70**	**58**	**135**	**299**
Total 2010-2014		**233**	**257**	**238**	**423**	**1.151**

Table 4: Total number of HF articles 2010-2015

A closer look at the percentage breakdown of the Types A & B shows that 59% of the articles published each year by IJMPB included these types (compared with all articles published) but neither IJPM or PMJ achieves this. The highest rate for PMJ was 48% and IJPM was 35%.

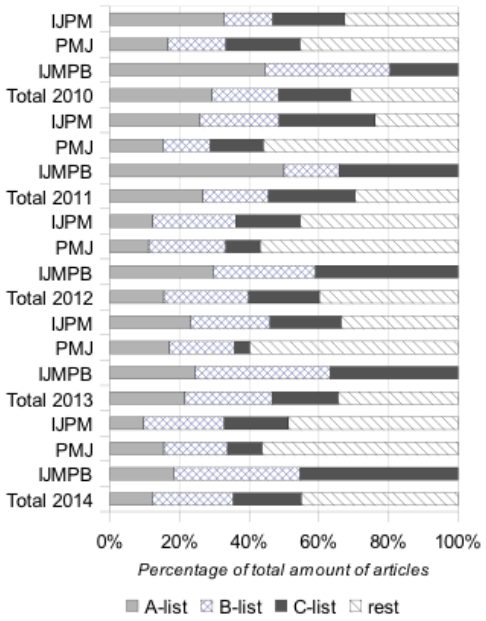

Figure 5: Stacked distribution of HF articles 2010-2015

The next subsection offers an even deeper analysis of the human factor textual use per article.

Topic richness per article

Table 4 shows the number of articles published that referred to 1 or more of the human factors. There are no consistent increases over the last 5 years when the A and B articles are combined but there is for Type B articles. Despite this it was seen that many articles contained more than 1 of the human factors, creating the opportunity to identify 'topic richness.' The premise being that the more topics included in an article, the greater the richness of attention paid to the human factor perspective. All of the 70 topics were used for this analysis and the result is presented in Figure 6.

Table 4: 'Human factor' articles based on Types A & B

Number of articles referring to HF topics (A + B list)				
	IJPM	PMJ	IJMPB	Total
2010	43	22	29	94
2011	53	19	25	97
2012	35	24	26	85
2013	52	25	31	108
2014	64	24	18	106
Total	247	114	129	490

Number of occurrences of HF topics (A + B list)				
	IJPM	PMJ	IJMPB	Total
2010	93	54	97	244
2011	109	37	100	246
2012	72	42	87	201
2013	121	57	85	263
2014	131	31	55	217

"Topic richness": Average HF topics per article (A + B list)				
	IJPM	PMJ	IJMPB	Total
2010	2,2	2,5	3,3	2,6
2011	2,1	1,9	4,0	2,5
2012	2,1	1,8	3,3	2,4
2013	2,3	2,3	2,7	2,4
2014	2,0	1,3	3,1	2,0

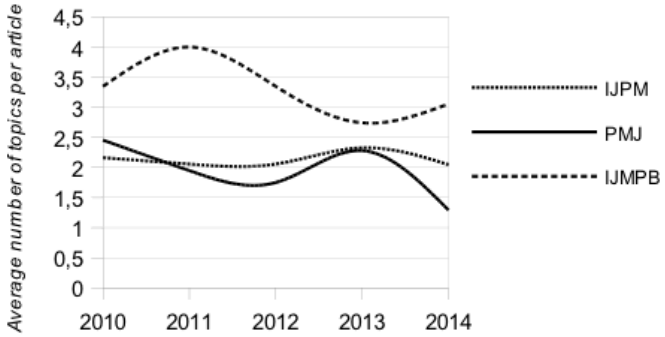

Figure 6: Topic richness in Type A and B articles

One can see that topic richness in IJPM and IJMPB articles remained largely consistent while PMJ showed the greatest (eventual) decrease. Most significantly, however, is that, when combined, the total topic richness has decreased in the last 5 years. In total and in general terms, the multiplicity of factor use diminishes which suggests that the individual focus of factors-per-article increases in the last 5 years. There are many possible explanations for this including (but not limited to) that researchers are becoming more narrowly focused in their investigation of any one particular factor or that they are more closely aligning specific factor(s) with the project management topic of the article in question.

To gain more insight in the research attention to human factors in project management the distribution of Type A articles were analyzed to see distinctions that could be made based on industries or countries.

Industry distribution

Industry focus (Table 5) was identified based on the data sources of the research conducted (ie, that identified by the authors). A considerable amount of the research was conducted across-industry (16%) in two or more industries. In some of the cases these were deliberate cross-level researches with the aim of comparing. In other cases the focus of the research was on a certain aspect of project management, for example, leadership, and the data was collected across a diversity of specified industries. In 15% of the cases the articles remained unclear on the aspect of industry being investigated. These contain secondary sources (Teddlie & Tashakkori, 2009) like literature reviews, conceptual papers on theoretical models and frameworks and articles apparently assuming generalizability on the subject discussed.

Table 5: Industry distribution

	By journal (2010-2014)*					By year (IJPM, PMJ and IJMPB)*				
	IJPM	PMJ	IJMPB	**Total**	**%**	2010	2011	2012	2013	2014
construction	32	7	15	**54**	23%	8	14	10	11	11
Cross-industry	15	12	10	**37**	16%	9	8	1	10	9
IT / telecom	18	6	12	**36**	15%	5	13	5	9	4
Industry Unclear / unspecified	18	10	6	**34**	15%	9	9	5	5	6
manufacturing	9	4	5	**18**	8%	6	2	3	5	2
professional services	9	3	3	**15**	6%	9	1	3	1	1
public services	3	4	3	**10**	4%	4	3	1	2	
leisure / entertainment	3	1	2	**6**	3%	1	1		2	2
other specific industries	8	5	10	**23**	10%	6	6	5	5	1
Total number of articles	115	52	66	**233**	100%	57	57	33	50	36

The vast majority of the articles are focused on one specific industry. The findings on industry distribution reflect the dominance of the industries traditionally associated with project management (construction and information technology). Further analysis shows a significant number of articles were concerned about research on human factors in the construction (including infrastructure, housing and architecture, 23%) and the IT / telecom sector (15%). Other industries addressed are manufacturing (product development, shipbuilding, automotive, 8%), professional services (change management, engineering 6%), public services (defense, social services, regional or urban planning 4%), leisure / entertainment (TV production, event management 3%) and other specific industries (less than 3%) such as finance, education and health care.

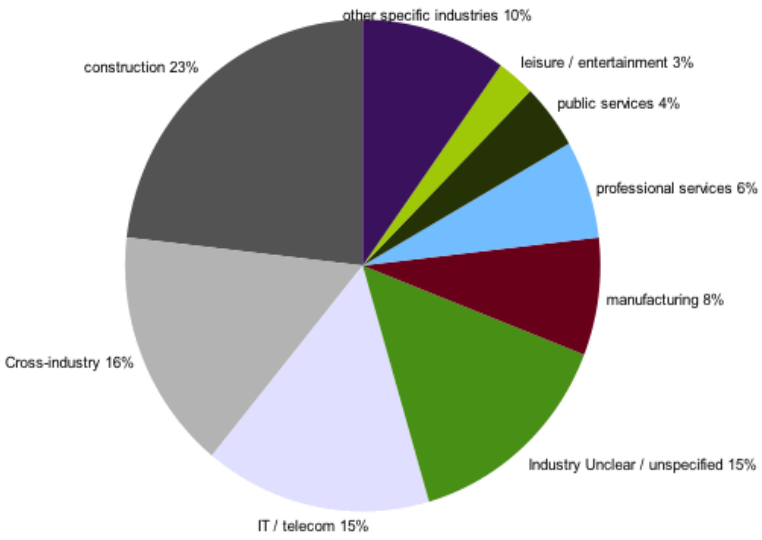

Figure 7: Industry distribution

Interesting differences (Figure 7) as well as similarities can be discerned in the emphasis on particular human factors. For example out of 54 articles on human factors in the construction sector most discussed factors are culture (16), trust (13), knowledge (13), behavior (12), conflict (11). In IT / telecom the human factors receiving the most attention are knowledge (11), leadership (9), communication (8), competence (7), learning (7), trust (6). These observations indicate these particular industries have evoked research attention to specific human factor topics that was of concern to them.

Geographic distribution

The first analysis on geographic characteristics was based on first author origin (Table 6). The analysis shows a large interest in PM human factor research in Australia, Scandinavia (Sweden, Norway and Finland), United Kingdom and North America (USA and Canada). About 24% of the articles are written by multiple authors from different countries. Since several authors have indicated project management might be less generalizable culturally (Hofstede, 1983) the authors suggest research on human factor topics in project management deserves more attention of other regions as well.

Table 6: Geographic distribution by region

Regional distribution	A-list articles	Contributing countries
Africa	7	South Africa, Ghana
Asia	38	China, Hong Kong, Pakistan, Republic of Korea, Malaysia, Taiwan, Israel, United Arab Emirates, Russia and Turkey
Australia	35	Australia, New Zealand
Europe	122	Austria, Czech Republic, Finland, France, Germany, Ireland, Italy, Norway, Poland, Spain, Sweden, Switzerland, The Netherlands, United Kingdom
North America	31	Canada, USA
South America	0	
	233	
International research collaboration	55	Africa: Ethiopia, Ghana Asia: Bangladesh, China, Hong Kong, India, Thailand, Taiwan, Saudi Arabia, United Arab Emirates, Russia Australia: Australia, New Zealand Europe: Austria, Finland, France, Germany, Italy, Norway, Portugal, Sweden, Switzerland, The Netherlands, United Kingdom North America: Canada, USA South America: Argentina, Panama)

5. Discussion

Addressing the four research questions will be the focus of the discussion. As Crawford et al (2006) did in their effort, this review 'reconciles different results and adds new findings, examining the changing development of the field, as represented by keywords.' Where they (and others) use keywords in the articles themselves, we used these keywords as topics that were provided by 220 practitioners in our examination of the field. With the view of 'analyzing the past to prepare for the future' (Webster and Watson, 2002), examining the attention paid by past scholars to journal articles leads us to one clear conclusion – attention has not been paid to the theme of 'human factors' in any meaningful way. This paper clearly shows that attention has been paid to the individual topics identified by the participants of the NWS (either individually or in pairs/groups) but the reviewers cited here have not shown the same attention in their benchmarking of project management research. This is a rich opportunity for future research.

In comparing coverage of the topics in the three chosen journals, we wanted to explore how each focused their attention on this theme and published topics within this scope. The three journals included have, of course, the same domain of interest but through their published scope statements, offer varying degrees of detail. This naturally affects the submission of articles but the correlation between the two is outside the bounds of this literature review. One of the key differences between the three is their launch date, with the *International Journal of*

Managing Projects the youngest and, most interestingly, the one to publish the most articles with the human factor topics identified by the NWS participants. Perhaps part of the explanation can be found in its scope statement which says that the 'current literature in this area lacks specific focus on the implementation of project management within a business context….[so the] International Journal of Managing Projects in Business responds to a particular reader need through its unique focus.'

In categorizing the topics by industry, we wanted to be consistent with the analytical lens we have chosen in the NWS. The participants work in the same industries as were used to categorize the topics herein.

In identifying regional distribution, we offered a very basic point of reference used by many reviewers of literature, and one that offers an interesting opportunity for future research. Countries/regions have different aspects of their culture, economy, political and educational systems and populations that undoubtedly affect the human factors of their project management community. The observations herein indicate where such research has and has not taken place, which, naturally, suggests opportunities for deeper and/or new explorations with future collaborators. It has also become evident that these factors have more research conducted by authors in developed countries than developing countries or underdeveloped countries. This may not be an indication that human factors are unimportant but that not much investigation is being carried out about human factors, which may be an opportunity for further project management research.

While human factors have shown an increased attention in project management journals, a deeper analysis shows that certain human factors are more important than other depending on the sector of the industry where project management is carried out.

Table 2 and Figures 2 and 3 show that certain factors have gained more attention than others, suggesting these areas need further attention and present more opportunities for research and collaborations with practitioners. The fact that four of these topics (collaboration, leadership, motivation and trust) were originally identified by the DNRG (for the National Workshop Series) underscores this point.

6. Implications for further research

As Teddlie & Tashakkori (2009) state 'the ultimate goal of the literature review is a synthesis' which 'involves the determination of themes in the literature, which are recurrent patterns of information across several different sources.' This review so far has shown us

much about the vocabulary used in recent PM literature. As the topics derived from the NWS were predominantly provided by practitioners, further analyses of NWS data can provide us with the information needed to compare contemporary research focus with practitioners needs. Besides showing the emphasis on specific human factor topics in research this review also revealed some other valuable topics for further investigation. In this perspective this initial literature review is considered to be the first step in a joint effort to develop 'an extensive and appropriate vocabulary' for addressing human factors as an organizational dimension affecting projects in a legitimate and coordinated way.

It is not assumed at this point that there will be a single meaning, so a thorough review of the uses of the factors amongst the 'Type B' papers is needed as to establish clearer meaning(s). Indeed, this is an initial review suggests / indicates multiple meanings for most factors which naturally demands further investigation.

7. Conclusions

Of all possible conclusions to this paper, the one that stands out is how clearly there is a lack of cohesion in this growing segment of project management practice and research. 'Human factors' was a subject introduced 20 years ago in the oldest peer-reviewed journal in this field and written about in hundreds of articles since, but it has not yet achieved traction amongst researchers as part of broader conversations. It parallels the discussions on project management maturity in some respects, in that it too didn't (and still hasn't in our opinion) achieve a common definition and understanding. For researchers looking for new areas of investigation, this review clearly indicates a plethora of opportunities to contribute to the underlying body of project management knowledge in the areas associated with human factors.

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