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Reviewing the IJPM for WBS: the search for planning and control

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Abstract

The 'Rethinking Project Management' research agenda created an environment for reconsidering project management practice. One suggestion is to focus on project management as an expression of creating value. However, this endgame perspective does not take into account the necessity of all projects to be created through tasks. In the first issue of the International Journal of Project Management (IJPM) published in February 1983, the editor wrote that one purpose of the Journal was to describe "...procedures, concepts and techniques that lead to successful planning and control..." Thus, one method of responding to the appeal for reconsideration of traditional perspectives is to explore the IJPM related to the agenda set in the 1980s. Work breakdown structure (WBS) is a one "procedure, concept or technique" utilized for project planning and control. Thus the search term WBS was instrumental in this review of IJPM Original Research Articles published between 1983 and 2013. A simple numerical ranking protocol indicated WBS significance in 140 documents. Although over 70% of articles used the term once or twice, WBS was not the article focus. A comprehensive document analysis found only 19 articles with substantive WBS content. However the review identified 11 research papers in which project management knowledge was expanded through development of more effective use of the WBS to plan and control project processes. Although this review did not find large numbers of WBS related planning and control articles, articles spanning three decades of IJPM indicates continuing WBS relevancy, if not popularity.

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1. Introduction

The ‘Rethinking Project Management’ research agenda created an environment for considering new models of project management practice. Winter, *et al.* (2006, p.700) suggest that by focusing on business projects, Project Management can be perceived as *value creating*. The authors indicate mainstream PM should ‘shift away from the traditional engineering view of projects’ to embrace the concept of business projects as ‘creating value and benefit for different stakeholder groups’.

The authors state that the purpose of their argument is not based on the view that considering projects as production of products is wrong, but that PM should ‘extend the traditional view with new concepts’. Their suggestion would mean changing the PM paradigm concerning the purpose of a project. The shift away from projects creating a concrete ‘product’ (doing) to projects creating an abstraction called ‘value’ (endgame). This endgame perspective of a project is quite different from the process perspective of doing a project (Chen, 2011). It could be argued that the traditional concept of ‘work’ to be done is a simple definition of a project (Fleming & Koppelman, 1996). In addition the planning and controlling of that work does provide both a concrete product and some form of abstract value for stakeholders (Rozenes, Vitner & Spraggett, 2004). Therefore, it may be useful to review a traditional “procedure, concept or technique” to provide a report on the traditional engineering view of projects.

2. Framing the IJPM review

One way to frame a study of the ‘traditional view of projects’ would be to choose one traditional “procedure, concept or technique” for consideration. Breakdown Structure (WBS) is considered a foundation concept of PM (Kolltveit, Karlsen & Grønhaug, 2007, p.5). Thus, reviewing the WBS concept as presented in the International Journal of Project Management (IJPM) published articles during the last 30 years could serve this purpose.

This study is a micro-analysis of WBS based on a ‘back to basics’ approach. This approach is linked to the first editorial of IJPM and the implications that follow from one of the stated purposes of the Journal. The IJPM was to help the ‘manager’ by describing ‘...procedures, concepts, and techniques that lead to successful planning and control...’ (Waller, 1983, p.3). The WBS is linked in many ways to these management concepts. For example, Kolltveit, Karlsen & Grønhaug (2007, p.5) outline features of the Task perspective: focus on control & planning through the Work Breakdown Structure, in their discussion of perspectives of project management.

3. Previous reviews of IJPM

This investigation of IJPM related to publications during the last 30 years joins a list of other meta-analysis reviews that have provided evidence of scope and scale of the discipline. Each of the four studies published in IJPM has added depth to our understanding of Project Management as both a practice and discipline:

- 1995, Betts & Lansley
International Journal of Project Management: A Review of the First Ten Years
- 2000, Themistocleous & Wearne
Project Management Topic Coverage in Journals
- 2006, Crawford, Pollack & England
Uncovering the Trends in Project Management: Journal Emphases over the Last 10 Years
- 2007, Kolltveit, Karlsen & Grønhaug
Perspectives on Project Management

In all these reviews the authors report a decline of articles focused specifically on planning and control - an original focus of the Journal. The decline in papers that discuss planning and control can be attributed to three

changes in how projects are executed. Firstly, the increase in computer capacity and capability has led to ‘easier’ planning and controlling based on software (Smith & Mills, 1983; Amani, Beghini & La Manna, 1993; Dillibabu & Krishnaiah, 2005). Second, the growth of ITC as a major part of all economic activity means an exponential growth in projects that are within organizations for business purposes (Van der Merwe, 1997). Finally, international differences concerning the pre-eminence of ‘being on time’ has assisted in shaping and reshaping the importance of the language and concept of management as an activity (Rees-Caldwell & Pinnington, 2013). Even with these changes it is interesting to note that WBS is only included in one PM publications analysis (Kolltveit, Karlsen & Grønhaug, 2007, p.5). Therefore this study aims to fill a small but significant gap in reviews of PM publications.

4. A short history and some definitions of WBS

In 1993 the PMI defined WBS as ‘a task-oriented “family tree” of activities which organizes defines, and graphically displays the total work to be accomplished in order to achieve the final objectives of the project (quoted by Chandrashekar, Mayfield & Samadzadeh (1993, p.30). Globerson (1994) adds two historical facts concerning the purpose of WBS. The US government required a WBS for their projects in the early 1960s. To support this requirement, the PERT Coordinating Group provided a clear definition of both the purpose and the process of a project WBS. The Work Breakdown Structure provides sub-divisions of project objectives, based on a network plan linking all levels of the WBS, from the highest (client) to the lowest (specific job). In addition project tasks are divided into ‘manageable units’ based on cost, resources and time data available for the additional purposes of ‘tracking’ and reporting (Smith & Mills, 1983, p.158).

Just over 15 years ago Bachy & Hameri wrote that the ‘work breakdown structure is the backbone of proper planning, execution and control’ of a project (1997, p.211). And five years ago Taxén & Lilliesköld (2008) indicated that WBS is the first step in the project planning process. The purpose is to organize project elements, known as project scope, so all the work that is required for the project can be taken into account. The family tree hierarchy of the WBS provides details of all levels (usually seven) of activity for a project (Shtub, 1995).

WBS is also perceived as a tool for managers (Abbasi & Al-Mharmah, 2000) specifically for planning and control activities (Tiner, 1985). Project planning also involves identification of phases of work, so that times as well as cost are considered in relation to work packages and other levels on the project WBS (Ayas, 1996). The process of providing work packages means that cost, time and risk can be evaluated for the total project (Tummala & Burchett, 1999), so that process becomes the unit of analysis. Only last year, Vanhoucke (2012) stated that drilling down to the lowest activity level of a project WBS can ‘trigger corrective action’ for perceived risk at an early stage.

The natural assumption, that WBS is product-oriented, may be because WBS is related to contracts for a final product. This is not the case. A wide variety of researchers and practitioners view the WBS from very different perspectives. For example: process, work, organization, teams and cost (Ahlemann, 2009). WBS orientation is based on the training and preferences of the project manager (Raz & Elnathan, 1999). Thus, a variety of clarification models have been devised linking the execution of work required and the product produced. Thus, WBS is at the center of development of alternative models that provide tools to deal with complexity (Turner & Cochrane, 1993). This short history and identification of degrees of definition indicates that the concept of Work Breakdown Structure is a traditional organizing principle of project management. The study explores the extent of WBS research activity through a review IJPM.

5. Research design

The first issue of *IJPM* was published in February 1983. The editor wrote that one purpose of the Journal was to describe "...procedures, concepts and techniques that lead to successful planning and control..." (Waller, 1983, p.3). As noted above the task-orientation was the foundation of Project Management, thus some indication of the contribution of WBS to the development of Project Management is of interest.

The study was designed as a document analysis (Bryman & Bell, 2007) to identify WBS research published in *IJPM*. The full run of the Journal is now available online through Science Direct. The internal search engine (May 2013) using the term WBS accessed 140 documents published between 1983 and 2013.

Each of the 140 documents was reviewed to verify that WBS was included. A second digital search in each document using the term 'work' provided a second search of the 140 documents (to capture the complete phrase work breakdown structure), thus ensuring an accurate sample. In only four documents was WBS/work breakdown structure absent. Only documents identified as "Original Research Article" were considered for inclusion in the analysis. Excluded from the sample were a group of 'miscellaneous' documents: nine book/software reviews, a keynote address, a news bulletin, an editorial and the response, and one article that was too hard to categorize. In addition, another fourteen Original Research papers that used WBS only as a figure label or in the abstract were also excluded.

The sample for consideration included 108 Original Research articles. A simple number ranking research protocol based on the number of times WBS was mentioned in the body of the article (not the abstract, key words or biographies) comprised six categories. The categories one-five included articles with these exact numbers, category 6+ indicating six or more mentions of WBS/work breakdown structure.

6. Analysis and discussion

The final review sample of Original Research articles consisted of 108 papers on a variety of topics, but all mentioned WBS at least once in the body text. A single mention of WBS was the most common, 56 articles (52.0%). Twenty articles or 18.5% of the sample used WBS twice. In the majority of articles with only one or two mentions WBS was often used as part of a standard two or three line history of PM.

In another 13 articles or 11.9% of the total sample, WBS/work breakdown structure was mentioned 3, 4 or 5 times. This means that the WBS concept was more integrated with the major topic. However, in some instances unnecessary repetition rather than integration accounted for the high number. Although a number of *IJPM* articles with 4 or more mentions of WBS are directly related to explaining how WBS works, this research report highlights only 6+ articles due to constraints of space.

Only nineteen articles (17.6% of the total sample) each have 6 or more mentions of WBS/work breakdown structure (exclusive of labels and lists). Two additional digital searches of each article in this sub-set (6+) searched for both terms "planning" and "control" as suggested as the purpose of the *IJPM* in the first editorial. The same 0-6+ ranking protocol was used to identify the number of times each term was used in the 19 research articles coded as 6+. All of these articles were concerned with the 'work' that needs to be done to complete a project.

For almost all papers reviewed the number of times WBS/work breakdown structure is used in the text is indicative of substantive importance. Document searching technology does make a 'search and find' fast, but these searches lack 'intelligent assessment' concerning meaning. Researcher judgment is necessary to develop meaningful criteria (Bryman & Bell, 2007), especially for analysis. Project Management researchers have defined WBS as a principle, a process, and a technique as noted above. Thus, only papers that explained, described or expanded specific concepts of WBS were considered for analysis that aimed to provide some indication of links to

the fundamentals of managing; planning and control of a project (Globerson, 1994). The paper does not report on the search of publications in IJPM using only the term ‘planning: 1676 items or ‘control: 1742 items.

6.1. Substantive sub-sets of WBS, planning and control

Analysis involved creating a database of three (hard) factors: date, title and keywords. In addition five (soft) interpretive factors provided the framework for analysis: 1) article purpose, 2) description of substantive WBS concepts, 3) WBS related application or model, 4) PM technique and 5) theory of management (Söderlund, 2004; Smyth & Morris, 2007; Kwak & Anbari, 2009). Each paper was read twice, once before reading the abstract to provide some form of ‘control’ for bias. However, the decisions and categorizations were based on personal researcher knowledge or ignorance concerning ‘what counts’ in relation to substantive WBS/work breakdown structure as integral to the purpose of the paper (Bryman & Bell, 2007).

The sub-set of 19 is representative of almost the entire 30 years of IJPM publication. Early papers are from 1983 and 1985, the majority of the papers (10) are spread through the 1990s, and seven papers span the years 2000-2012.

Analysis of the 19 articles clearly defined planning and control as a major contributor to a significant number of the projects, both in titles and key words. The underlying management theory, Scientific Management, was identified from an explicit or implicit positivist perspective (Smyth & Morris, 2004) or task-orientation (Kolltveit, Karlsen & Grønhaug, 2007) wording in the text. Eleven (57.9%) of the 19 articles have six or more mentions of both planning and control terms. Thus these 11 papers score 6⁺ for all three terms: WBS/work breakdown structure, planning and control.

The other eight papers are an interesting mix not easily categorized. One paper does not use either word. Four papers use ‘control’ six or more times, but the use of ‘planning’ runs from 0-3 times. The other three articles are a mixture. This variety could be interpreted as the extent of inclusion of project management professionals and academics (Crawford, Pollack & England, 2006). At the same time the links between the practice of WBS/work breakdown structure and its intention for planning and control are in keeping with the original intent of IJPM.

The eleven papers allotted 6⁺ for all three terms: WBS/work breakdown structure, planning and control constitute only 10.2% of the total sample of 108 Original Research papers. Yet taken as a whole these papers are concerned with the problem of how to do the work required to initiate and complete all phases of a project. Five of the papers emphasize topics related to planning: organizational fit (Amami, Beghini & La Manna, 1993), project pre-planning (Bachy & Hameri, 1997), scope definition (Turner & Cochrane, 1993; Chen, 2011). Six of the articles expand on the WBS concept for project control: data integration (Shtub, 1995; Raz & Elnathan, 1999; Rozenes, Vitner & Spraggett, 2004), Taxén & Lilliesköld, 2008), work activities (Tiner, 1985; Abbasi & Al-Mharmah, 2000), and handover (Ahlemann, 2009). Each of the three decades of IJPM publications is represented in this group indicating a continuity of one traditional concept/process, WBS, indicative of the task-orientation of the engineering perspective of project management.

7. Conclusion

Reviews of journal publications linked to specific professions and academic disciplines provide a snapshot of growth. In addition reviews provide the necessary historical record that accrues to mature practice-based disciplines.

This publications review focused on a foundation principle of PM, WBS/work breakdown structure, in IJPM published articles. The study found that WBS/work breakdown structure is mentioned in only 108 Original Research articles. This is not a large number. However, the even smaller number of papers, 11, do consider WBS

an important concept for the practical aspects of planning and controlling work activities necessary to complete a project. While the number of papers dealing with substantive issues of WBS is limited, it is encouraging that a traditional view of project management based on a task to be performed, remains linked to the current literature.

A more complete report of a larger study is currently in progress.

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Appendix A. Author and date list of 19 IJPM Original Research Articles: WBS 6⁺ sub-set (see References)

1. Abbasi, G. Y., & Al-Mharmah, H. A. (2000).
2. Ahlemann, F. (2009).
3. Amami, M., Beghini, G., & La Manna, M. (1993).
4. Ayas, K. (1996).
5. Bachy, G., & Hameri, A-P. (1997).
6. Chen, C.-Y. (2011).
7. Dillibabu, R., & Krishnaiah, K. (2005).
8. Fleming, Q. W., & Koppelman, J. M. (1996).
9. Globerson, S. (1994).
10. Raz, T., & Elnathan, D. (1999).
11. Rozenes, S., Vitner, G., & Spraggett, S. (2004).
12. Shtub, A. (1995).
13. Smith, L. A., & Mills, J. (1983).
14. Taxén, L., & Lilliesköld, J. (2008).
15. Tiner, W. D. (1985).
16. Tummala, V. M. R., & Burchett, J. F. (1999).
17. Turner, J. R., & Cochrane, R. A. (1993).
18. Van Der Merwe, A. P. (1997).
19. Vanhoucke, M. (2012).

Appendix B. Author and date list of 11 IJPM Original Research Articles: WBS 6⁺+ planning 6⁺+ control 6⁺ sub-set (see References)

1. Abbasi, G. Y., & Al-Mharmah, H. A. (2000).
2. Ahlemann, F. (2009).
3. Amami, M., Beghini, G., & La Manna, M. (1993).
4. Bachy, G., & Hameri, A-P. (1997).
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