

Project Management: Incentive Design and Work Package Planning

by

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Abstract:

We address two problems that arise generically in project management.

The first problem involves mitigating the widely observed behavioral issue of Parkinson's Law, which wastes the benefit of early task completion, thus leading to poor project performance. We describe an incentive-compatible mechanism to resolve Parkinson's Law for critical path method (CPM) planning. This scheme also resolves Student Syndrome, and is group-strategy-proof. We also describe a mechanism to resolve Parkinson's Law under critical chain project management (CCPM). Finally, we develop a mechanism for repeated projects, where commitments to early completion continue for subsequent projects. This work provides an alternative to CPM planning, which is vulnerable to Parkinson's Law, and to CCPM planning, which lacks formal control of project progress.

The second problem involves understanding how design decisions at the planning stage of a project affect its cost of execution. Defining smaller work packages increases project complexity and workload, and reduces economies of scale. Whereas, defining larger work packages results in reduced concurrent processing, and less precise monitoring and estimation. We develop a heuristic method, which delivers near-optimal work package solutions. This method greatly outperforms the work package sizing rules that are typically used in practice. Extensions of our model to consider task incompatibility, resource sharing and crashing, and uncertain task durations are also discussed. This work enables more precise project planning, and provides insights that guide resource allocation decisions.

Bio:

Nicholas G. Hall is a Professor in the Department of Management Sciences at the Fisher College of Business, and has a courtesy appointment in the Department of Integrated Systems Engineering, at The Ohio State University. He holds a Ph.D. in Management Science from the University of California, Berkeley (1986), as well as B.A., M.A. degrees from the University of Cambridge, and a professional qualification in accounting. His research interests are in project management, incentives, scheduling, and pricing, and applications of operations research. He has published over 80 articles in the journals *Operations Research*, *Management Science*, *Mathematics of Operations Research*, *Mathematical Programming*, *Games and Economic Behavior*, *Interfaces*, and several other journals. His main teaching interest is in project management. He has served for a total of over 40 years on the editorial boards of *Operations Research* and *Management Science*. He has given over 350 academic presentations, including 112 invited presentations in 24 countries, 11 conference keynote presentations, and nine INFORMS national conference tutorials. A 2008 citation study ranked him 13th among 1,376 scholars in the operations management field. He won the Fisher College Pacesetters' Faculty Research Award in 1998 and 2005. He has served as President of Manufacturing and Service Operations Management society (1999-2000), and as Treasurer of INFORMS (2011-2014). He has served on the State of Ohio Steel Industry Advisory Council (1997-2002). He has been a visiting professor at the Wharton School (University of Pennsylvania) and Kellogg School (Northwestern University). He is the owner of a consulting business, CDOR, which provides business solutions to the Ohio business and government communities, and advice on intellectual property issues to New York City law firms. In 2018, he will be the 24th President of INFORMS.

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All are welcome!