Analysis of Research Ideas: Combining Metaphors for Research

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Abstract: This paper presents a framework – idea puzzle – for scientific analysis of research ideas. Analysis of research ideas is included in research planning ahead of research implementation and reporting. Research planning is traditionally based on the project metaphor for research which specifies linear tasks, deliverables and deadlines. Such a metaphor does not make explicit, however, decisions which are implicit in research tasks. This gap is fulfilled by the jigsaw puzzle metaphor which specifies interdependent and iterative decisions instead. Idea puzzle framework illustrates the jigsaw puzzle metaphor since it is a synthesis of scientific method in twenty one decisions. Such decisions specify the theoretical, empirical, methodological, rhetoric, and authorial context of a research idea. The main benefits of idea puzzle framework are twofold. On the one hand, it facilitates the learning and teaching of scientific method. On the other hand, it accelerates the scientific generation, analysis, planning, and evaluation of research ideas.

Keywords: analysis of research ideas; research planning; research metaphors; research decisions; scientific method.

1 Introduction

As the name implies, research is search and re-search, trial and error. An indicator of such a degree of uncertainty is the small percentage of research which is accepted for publication in highly cited scientific journals [1]. Other indicator is the small percentage of research which results in marketable products and services [2]. To aggravate things

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further, both scientific citations and patents are increasingly concentrated in a few highly interdependent city-regions worldwide [3]. In spite of such a low rate of success and high geographic concentration, research is regarded as a crucial activity for different types of innovation especially in industries characterized by shrinking product life cycles. In fact, it is widely accepted that long-term investment in research, development and innovation ensures sustainable competitiveness of citizens, organisations, and countries [4]. The European Year of Creativity and Innovation 2009 [5] is an example of such a belief in information societies, knowledge economies, and learning organisations.

Given the importance of research for society, it may be asked whether the rate of research which is converted in scientific citations and patents could be improved with ex ante analysis of research ideas. In other words, analysis of research ideas may improve research planning ahead of research implementation and reporting. A research process would thus be regarded as consisting of three generic phases: research planning, research implementation, and research reporting. Such reasoning follows the assumption that "every failure of implementation is, by definition, also a failure of formulation" [6].

Research planning is traditionally based on the project metaphor for research which specifies linear tasks, deliverables and deadlines. The employment of such a metaphor in research planning is well illustrated with tools such as GANTT chart [7]. The project metaphor benefits research planning since it provides an overview of a research process. In addition, it emphasises uncertainty reduction over time [8] and specifies tasks such as literature review, data collection and data analysis [9]. The project metaphor is not without limitations, however. The main limitation is that tasks may be confounded with decisions. In other words, a planned task such as literature review leaves unplanned the decision of which streams of thought to review. Such type of ambiguity may generate, in turn, unnecessary inefficiencies in the whole research process. The research question of this paper is, therefore: how does the jigsaw puzzle metaphor complement the project metaphor in the analysis of research ideas?

The jigsaw puzzle metaphor is complementary to the research project metaphor since it makes explicit research decisions which otherwise would remain implicit in planned tasks. Other benefit of the jigsaw puzzle metaphor is that decisions are regarded as interdependent. Such interdependence results from the interplay of three generic domains in a research process: conceptual, substantive and methodological [10]. A third benefit of the jigsaw puzzle metaphor is that decisions are regarded as iterative since they influence one another along alternative paths of decision-making [10].

Research planning in general and analysis of research ideas in particular thus benefits from the combination of project and jigsaw puzzle metaphors for research. The project metaphor specifies linear tasks, deliverables, and deadlines whereas the jigsaw puzzle metaphor makes explicit interdependent and iterative decisions. Such decisions, in turn, require decision-making criteria. General criteria include political, economic, social, technological, environmental, and legal factors. Other criteria are implicit in scientific method since it is "a set of assumptions and procedures for knowledge acquisition consistent with scientific norms" [11]. It has been claimed, however, that incipient methodological training and lack of concrete prescriptions in methodological textbooks prevents students, researchers, lecturers, and external research evaluators from applying scientific method more explicitly in the analysis of research ideas [12].

2 Idea puzzle framework

Idea puzzle framework is a synthesis of scientific method in twenty one decisions which can be applied by students, researchers, lecturers, and external research evaluators in the analysis of research ideas. Such a framework is inspired by previous contributions which regard research as a process of interdependent and iterative decisions concerning theory, data, and method [10]. Idea puzzle framework includes decisions concerning such three domains – conceptual, substantive, and methodological – as well as two other domains – rhetoric and authorial. In the terminology of idea puzzle framework such five domains of a research process as labeled the five contexts of a research idea.

The theoretical, empirical, and methodological contexts correspond, respectively, to the conceptual, substantive, and methodological domains previously identified [10]. The rhetorical context, by contrast, was added to idea puzzle framework based on recent calls for more engaging research [13]. Finally, the authorial context was added to idea puzzle framework in order to reflect the importance of research leadership [14].

Such five contexts of a research idea can, in turn, be specified in twenty one decisions. The theoretical context includes five decisions: 'keywords', 'streams of thought', 'research gap', 'research question', and 'state of the art'. The empirical context, on other hand, includes five decisions: 'unit of analysis', 'unit of observation', 'nature of data', 'origin of data', and 'sample'. The methodological context includes five decisions: 'scientific paradigm', 'research strategy', 'collection techniques', 'analysis techniques', and 'quality criteria', whereas the rhetoric context includes three decisions: 'persuasion', 'logic', and 'credibility'. Finally, the authorial context includes three decisions: 'wisdom', 'trust', and 'time'.

Although the five contexts and respective decisions are here presented in a linear sequence any other sequence is valid in research planning as long as the decisions are aligned in the light of scientific method [11]. The following paragraphs provide a brief overview of the twenty one decisions.

The theoretical context is especially important in basic research [10] as well as in exclusively theoretical research which aims to publish literature reviews. The decision 'keywords' refers to two theoretical keywords which are implicit in the research idea as well as in the title of research plans and scientific publications [15] [16] [17]. It implies, in particular, that a research idea can be formulated as a cause-effect relationship between two theoretical keywords. In order to be considered theoretical, keywords should be subject of scientific publication. The two possible cause-effect relationships between the two keywords correspond to two alternative research ideas. Idea puzzle framework in general and the decision 'keywords' in particular can thus be adopted in order to accelerate the scientific generation of research ideas.

The decision 'streams of thought', on the other hand, refers to research communities which contextualise the research idea theoretically. The decision 'research gap' refers to a theoretical, empirical or methodological gap which experts and respective streams of thought recommend for further research. Finally, the decision 'state of the art' refers to the literature review of the answer given by the selected streams of thought to the research question.

The empirical context, on the other hand, is especially important in applied research [10]. The decision 'unit of analysis' refers to the empirical unit which is compared in order to infer conclusions about the keywords. The decision 'unit of observation', on the other hand, refers to the entity which gives access to data about the

unit of analysis. The decision ‘nature of data’ refers to data which are collected and analyzed in order to characterize the unit of analysis, whereas the decision ‘origin of data’ refers to the context in which data are generated. Finally, the decision ‘sample’ is a specific set of sampling units or cases which illustrate the unit of analysis.

The methodological context is especially important in technological research [10] and whenever it is necessary to bridge theory and data, that is, the theoretical and empirical contexts of a research idea. The decision ‘scientific paradigm’ refers to a set of ontological, epistemological, and methodological assumptions which contextualises the research methodologically [11] [18]. The decision ‘research strategy’, on the other hand, refers to a “set of assumptions and procedures for knowledge acquisition consistent with scientific norms” [11] [19] [20] [21] [22] [23]. The decision ‘collection techniques’ refers to procedures for data collection, whereas ‘analysis techniques’ refer to procedures for data analysis [23]. Finally, the decision ‘quality criteria’ refers to criteria which ensure scientific validity and reliability, among others [11] [18] [23].

The rhetorical context is especially important in order to render research more persuasive, logic, and credible [13]. The decision ‘persuasion’ refers to arguments which convey the emotional message of a research idea including namely in terms of scientific, entrepreneurial, and social interest as well as ethical and political conflicts of interest. The decision ‘logic’, on the other hand, refers to the scientific logic which conveys the rational message of the research idea [22]. Finally, the decision ‘credibility’ refers to scientific triangulation of theoretical, empirical or methodological options [18] [24].

The authorial context is especially important in order to render research more viable due to leadership [14]. The decision ‘wisdom’ refers to a set of values, education, and experience of the researcher which leverages the research. The decision ‘trust’, on the other hand, refers to a set of contacts of the researcher which also leverages the research. Finally, the decision ‘time’ refers to the availability of the researcher which equally leverages the research.

Authorial decisions are inspired in previous contributions on forms of capital, namely cultural, social and economic capital [14]. Such three forms of capital can be considered mutually reinforcing. In idea puzzle framework, cultural capital is regarded as ‘wisdom’ in order to encompass values, experience, and knowledge. Such three types of wisdom are different namely in terms of tangibility and durability. On the other hand, idea puzzle framework regards social capital as ‘trust’ since contacts per se might not be functional due to distrust. Economic capital is regarded in idea puzzle framework as ‘time’ since the latter is a general economic resource which is measurable but not recoverable. Taken together, the three authorial decisions of idea puzzle framework can also be associated with Einstein’s explanation for the equivalence of energy and matter in the equation e=m.c^2. Theory of relativity refers to physical energy as the product of mass and speed of light. Human energy, by contrast, can be formulated as critical mass (wisdom) which is empowered by timely trust: e=w.t^2. In other words, research requires leaders who ensure critical mass as well as trust and time.

3 Conclusion

A research process consists of three generic phases: research planning, research implementation, and research reporting. Research planning includes the analysis of research ideas which, in turn, benefits from the combination of project and jigsaw puzzle metaphors for research. The project metaphor specifies linear tasks, deliverables and deadlines. The jigsaw puzzle metaphor, by contrast, specifies interdependent and iterative decisions. Such decisions can, in turn, be analyzed with several criteria for decision-making. Criteria include political, economic, social, technological, environmental, and legal factors as well as scientific method as a set of assumptions and procedures for knowledge acquisition consistent with scientific norms.

Idea puzzle framework illustrates the jigsaw puzzle metaphor for research since it is a synthesis of scientific method in twenty one decisions. Such decisions specify the theoretical, empirical, methodological, rhetoric, and authorial context of a research idea. The main benefits of idea puzzle framework are twofold. On the one hand, it facilitates the learning and teaching of scientific method. On the other hand, it accelerates the scientific generation, analysis, planning, and evaluation of research ideas. The main users of idea puzzle framework are students, researchers, lecturers, and external research evaluators in any field of knowledge.

Idea puzzle framework has, therefore, implications for education, research, industry and society. In terms of education, it allows students to get acquainted with scientific method in the context of their own ideas. Such hands-on-approach to methodology motivates students to learn scientific method and apply it in research planning. On the other hand, it allows lecturers to assess the methodological awareness of students and adopt a standard framework for transparent comparison of research plans. Such benefits extend to researchers and external research evaluators in general.

In terms of research, idea puzzle framework offers a point of departure for several research avenues. On the one hand, it offers a synthesis of scientific method into five contexts and twenty one decisions which is naturally open to debate. In particular, it is possible to debate whether such a synthesis is sufficiently comprehensive in terms of decisions and generalisable to any field of knowledge. On the other hand, it is possible to research the four hundred and twenty direct relations between the twenty one decisions. Such a matrix of direct relations may provide insights on patterns of methodological choice. In addition, it is possible to research dynamics of decision-making in terms of paths along the five contexts and twenty one decisions of idea puzzle framework.

For industry, idea puzzle framework offers the possibility for applying scientific method in the analysis of research ideas. In particular, it becomes possible to outsource research evaluation based on idea puzzle framework.

For society at large, idea puzzle framework contributes to the dissemination of scientific method and to democratization of science by making it more inclusive. In particular, idea puzzle framework allows growing numbers of authors worldwide to analyze their research ideas online and for free [25].

References and Notes

1. Kyrö, P. & Kansikas, J. (2005) Current state of methodology in entrepreneurship research and some expectations in the future. In Fayolle, A. & Kyrö, P. & Ulijn, J. *Entrepreneurship Research in Europe*, UK: Edward Elgar, pp. 121-149.
2. Jones, G. (2007) *Organizational Theory, Design and Change*, 5th Edition, Pearson Education.
3. Florida, R. (2005) The world is spiky. *Atlantic Monthly*, October, pp. 48-51.
4. Madureira, R. (2008) The role of business schools in the doctoral paradox. *European Business Review*, Special Issue: Business Schools or Schools for Scholars? Vol. 20, No. 2, pp. 98-111.
5. The key message of the European Year of Creativity and Innovation 2009 is the following: "Creativity and innovation contribute to economic prosperity as well as to social and individual wellbeing." Retrieved from http://create2009.europa.eu/ on the 28th of April 2009.
6. Mintzberg, H. (1994) *The Rise and Fall of Strategic Planning.* Cornwall, UK: Prentice Hall, p. 26.
7. Gantt, H. (1974) *Work, Wages and Profits*, Easton, Pennsylvania: Hive Publishing.
8. Unpublished presentation slides by Prof. Kristian Möller from the University of Helsinki, Finland.
9. Unpublished presentation slides by Prof. Petri Helo from the University of Vaasa, Finland.
10. Brinberg, D. and McGrath, J. (1985) *Validity and the Research Process*. Beverly Hills, CA: Sage Publications.
11. Morais, R. (2009) Scientific method. In Mills, A., Durepos, G. and Wiebe, E. (eds.) *Encyclopedia of Case Study Research*, Thousand Oaks, California: Sage Publications, forthcoming.
12. Easton, G. (2000) Case research as a method for industrial networks: a realist apologia. In S. Ackroyd and S. Fleetwood (eds.) *Realist Perspectives on Management and Organisations*. London: Routledge, pp. 205-219.
13. Van de Ven, A. (2007) *Engaged Schoolarship: Creating Knowledge for Science and Practice.* Oxford: Oxford University Press.
14. Bourdieu, P. (1986) The forms of capital. In Richardson, J. (ed.) *Handbook of Theory and Research for the Sociology of Education*, New York: Greenwood, pp. 241-258.
15. Sutton, R. and Staw, B. (1995) What theory is not. *Administrative Science Quarterly*, Vol. 40, No. 3, pp. 371-384.
16. Weick, K. (1995) What theory is not, theorizing is. *Administrative Science Quarterly*, Vol. 40, No. 3, 385-390.
17. Whetten, D. (1989) What constitutes a theoretical contribution? *Academy of Management Review*, Vol. 14, No. 4, pp. 490-495.
18. Lincoln Y. and Guba, E. (2000) Paradigmatic controversies, contradictions, and emerging confluences. In Denzin, N. and Lincoln, Y. (eds.) *The Handbook of Qualitative Research*, Second Edition, Thousand Oaks: Sage Publications, pp. 163-188.
19. Bonoma, T. (1985) Case research in marketing: opportunities, problems, and a process. *Journal of Marketing Research*, Vol. 22, May, pp. 199-208.
20. Brewer, J. and Hunter, J. (1989) *Multimethod Research. A Synthesis of Styles*. Sage Publications.

21. McGrath, J. (1982) Dilemmatics: the study of research choices and dilemmas. In McGrath, J. Martin J. and Kulka, R. (eds.) *Judgment Calls for Research*, Beverly Hills: Sage Publications, pp. 69-102.
22. Morais, R. (2009) Critical realism and case studies in international business research. In Piekkari, R. and Welch, C. (eds.) *Rethinking the Case Study Approach in International Business Research*, Cheltenham, UK: Edward Elgar Publishing, forthcoming.
23. Yin, R. (2002) *Case Study Research: Design and Methods*. Third Edition, Thousand Oaks: Sage Publications.
24. Jick, T. (1979) Mixing qualitative and quantitative methods: triangulation in action. *Administrative Science Quarterly*, Vol. 24, No. 4, pp. 602-611.
25. A free online software based on idea puzzle framework is available at www.ideapuzzle.com since the 20th of April 2009.