Accounting for Differing Perspectives and Values: the Rail Industry

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Abstract This chapter reflects on how researchers have worked in different ways with industry in five research projects, investigating and implementing solutions for problems related to human and organisational factors (HOF). Three observations are presented on how improvements can be made in the management of HOF.

Keywords Railway; Organisational and inter-organisational relationships; Roles of researchers and managers

1 INTRODUCTION

We often think that our own view is the best one, though there are many different perspectives of work, the workplace and organisations. People in different roles, levels of management, business functions or disciplines (e.g. safety, human factors, human resources, management science) have interests in the management of human and organisational factors (HOF)[1]. Safety is often explained as a priority, but other factors (such as financial

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[1] Human and organisational factors (HOF) as discussed in this chapter are considered to be synonymous with ergonomics and human factors (E/HF), as defined by the IEA – https://www.iea.cc/whats/

costs, production statistics, customer satisfaction) can be priorities for some people. Attention can focus on control of obvious problems (e.g. accidents during normal operations), though a narrow focus can allow vulnerability to threats from less common issues, or those that are hard to solve, especially in complex contexts, with involvement of multiple organisations.

This chapter is structured around three observations, more specifically, steps or strategies that can be considered to improve the management of HOF. These have been identified from reflection on a selection of railway research projects carried out at the University of Nottingham. The observations are as follows: (i) that there is a lack of clarity on how HOF should be managed alongside other business objectives; (ii) that there is a need to look again at the respective roles of researchers and managers in research and practice in HOF; (iii) that HOF can be viewed as a method or analysis tool to understand the reality of people at work or interacting with systems.

2 THE RESEARCH STUDIES

Overviews of the five projects that have informed the observations on the management of HOF are given in the following tables.

Table 2.1 Overview of research project 1

What do people do on the railway	
Part A	The first piece of work supported the infrastructure manager in understanding their processes for rail engineering work (Wilson et al, 2009), including observing engineering work sites, interviews with staff in various roles, and group meetings to develop, display and discuss typical working scenarios (e.g. Schock et al, 2010). This produced an in-depth understanding of work functions and risks, descriptions of contexts and human factors affecting performance of functions. Even though we identified thematic areas and rec-

	ommended programmes of work to tackle these, we were not always successful in engaging with the client and there was a perception that this was not solving the problems quickly enough.
Part B	The second study was carried out for the European Union Agency for Railways (ERA), who wanted to overcome perceived bias in the industry towards technical standards (Pickup et al, 2013). This focused on what people do in a wider range of frontline railway roles (driving, rail control, station dispatch, rolling stock maintenance, infrastructure engineering). This was important in identifying: different types of *organisational* and *individual goals*; what people need to do (i.e. the *human functions*) in various *contexts*; and the *safety relevant activities* associated with these human functions.

Table 2.2 Overview of research project 2

Improving safety performance in the construction supply chain	
Context	In road/rail transport construction, projects are usually conducted by multiple organisations. Evaluating the success of interventions in this type of dynamic, multi-organisational context is not straightforward. Consequently, effective evaluation studies are often not carried out.
Part A	21 interviews across the supply chain explored factors affecting leadership in multi-organisation projects (Stiles et al, 2018). 26 different examples of safety leadership have been identified, aligned with nine areas from literature (e.g. demonstrating safety as a top priority, enabling safety reporting).
Part B	The effectiveness of a suite of leadership interventions is being explored in a longitudinal study in six large engineering projects. Progress (what is being implemented and how) is being tracked using theory of change methodology (Hills & Junge, 2010) to make sense of the wide-ranging data.

Table 2.3 Overview of research project 3

What do business leaders want	
Context	It is not known whether industry decision-makers talk naturally about safety concepts from literature (e.g. top down/bottom up safety approaches, how different forms of risk can be addressed, the nature of communications, and resilience) or how these are useful to managers.
Part A	25 in-depth interviews were carried out with rail industry leaders (Nolan-McSweeney et al, 2017), to determine what senior executives/managers really want in relation to safety and business performance. The interviews provide insight to what leaders think about trade-offs involving safety, organisational structure, the desire for improvement and the challenges in implementing changes across the industry.
Part B	Two business change programmes are also being tracked over an extended period. Research activities (interviews with programme managers, review of project documents and meetings, surveys and observational work with frontline staff) are collecting broad ranging data on the programmes and safety and business performance (Nolan-McSweeney et al, 2018). Emerging findings indicate that industry leaders have a good awareness of problems with implementation of change programmes.

Table 2.4 Overview of research project 4

Railway suicide – A continuing threat to safety and performance on the railway	
Context	There are many known prevention methods for railway suicide, but there have been few efforts to evaluate their effectiveness (Ryan et al, 2018).
Part A	A collaborative project between academic researchers and industry, (Ryan et al, 2018), developed and implemented a method to identify the most promising safety interventions for field testing.

Part B	One of the promising fencing interventions has been evaluated over an extended period of time (Wronska & Ryan, 2017). Detailed, descriptive data are being collected on the extent of implementation and the impacts of the safety intervention. Understanding the context into which the intervention is placed has been critical.
Part C	A simple evaluation framework has been developed in conjunction with the industry to support the collection of better evidence on the effectiveness of various types of safety prevention measures (Ryan, Wronska & Stevens, 2017). In spite of engagement with the industry throughout the development process, difficulties were experienced when piloting the framework with industry partners. Very simple barriers hindered progress (e.g. lack of time, not knowing where to start collecting data).

Table 2.5 Overview of research project 5

Developing new lighting products for stations	
Context	This is an innovation project, led by an industry partner, with researchers working closely with industry to provide the underpinning theory and research support. The project considers: What characteristics or qualities of lighting (e.g. movement, intensity, colour) could influence behaviour (wayfinding and crowd movement)?
Part A	Review of state-of-the-art in lighting and stakeholder engagement to support the specification and design of new lighting products for stations.
Part B	Evaluation of the effectiveness of new products (using human factors methods and new sensing technologies).

3 OBSERVATIONS ON THE MANAGEMENT OF HOF

The projects had different aims and contexts, though some overlap in their focus. There is commonality in the methods, but also differences in their application. The three observations introduced initially in section 1, are expanded below.

3.1 The Lack of Clarity on how HOF Should Be Managed alongside other Business Objectives

There are multiple goals (organisational and personal – Project 1, Pickup et al 2013) and different objectives that can take precedence in different situations and contexts (Wilson et al 2009). The extent to which objectives such as safety and business performance can or should compete is not clear. The interviews with business leaders (Project 3) collected views on their priorities. It is too simplistic to view these as two-way trade-offs (e.g. cost vs safety). In practice, there are likely to be inter-changeable priorities, from amongst two or more objectives. The importance of context in trade-offs needs to be recognised.

A second consideration is that many commercial ventures are conducted by an array of organisations for a defined period. There are opportunities for leadership interventions and supply chain management to influence processes and organisational practices along the supply chain (Project 2), but to date there has been little research in this area. Units in the supply chain should not be viewed as static or homogenous entities. There will be pockets of culture in organisations and variation in behaviours within an organisation, due to the relationships and influences in multi-organisational projects.

Survivability can be considered at the heart of organisational decision-making in many circumstances. Supply chain logic indicates that organisational transition can be expected over time from survival to growth (Gurău, 2011). As HOF scientists and practitioners, it is important to support transitioning from a goal of survivability of the organisation to one of fulfilment of organisational needs. This can include continued efforts to raise the prominence of safety and related factors and ensure that these receive appropriate consideration alongside other objectives.

It is clear that scientists need to work with industry to be able to understand the nature of the business trade-offs as a first step in determining organisational priorities in a transitory multi-organisational context. This could include providing the tools to specify and work with data from industry and providing descriptions of the contexts and situations in which these trade-offs can occur. Doing this within a truly collaborative environment is

desirable, though this is rarely achieved in practice. The respective roles of two of the stakeholders (researchers and users of HOF research, e.g. managers, practitioners, Dempsey, 2018) are considered in more detail below.

3.2 Looking again at the Roles of the Researcher and Manager

In our projects, there were differences in the roles of the researchers and how they interacted with industry, potentially impacting on the success of the project. Implementation of a solution from academic or industry-based research is not a straightforward exercise. We have learned by experience about what can help build and inhibit collaboration in projects, such as differences in the motivations, experience, knowledge and expectations of ourselves and the other stakeholders.

In Project 1 we worked closely with industry over extended periods in the early, data gathering phase, but we could not maintain this type of collaboration through all of the research and implementation phases. We encountered similar problems in sustaining engagement in Project 4. What may appear to be good fortune (an insider researcher, Coghlan, 2001) facilitated access to interviews with senior decision-makers in Project 3, identifying different perspectives within and between organisations. Here the role of the researcher was critical. There are advantages to the manager-researcher (insider researcher) role, such as pre-understanding of the organisation and ability to manage organisational politics (Coghlan 2001), often achieving results that are not possible from an outsider (Galea 2009). There are also challenges, where the manager–researcher has to "reframe their understanding" of the organisation, overcome problems associated with having a dual role (Coghlan 2001) and various ethical issues (Galea 2009).

Considering how to improve collaboration between researchers and operational staff is not a new question. Churchman and Schainblatt (1965) reported that science and management need to know each other better. However, achieving "mutual understanding" (Churchman & Schainblatt, 1965), which is really at the heart of this problem, is not a simple endeavour. One explanation for this is that managers and scientists are not open

about their real methods (e.g. how managers make decisions, or how researchers work creatively, Churchman & Schainblatt, 1965).

The researcher/practitioner gap has been explored in the discipline of ergonomics/human factors (Shorrock & Williams, 2016), pointing out problems of accessibility and usability of some academic methods. There has been reluctance to "give away" ergonomics methods to industry/novices (Stanton & Young 2003), because of a required level of knowledge/expertise for the reliable and valid application of the methods. These findings on the utility of methods are important, but the interface between these groups needs closer scrutiny, to develop better collaborative work programmes. Reid et al (2016) have suggested that there is a bi-directional relationship, considering how to move ergonomics concepts from research to practice and ergonomics problems from practice to research. This is influenced by researchers (who worry about conducting "good research" for various reasons) and practitioners (who may not appreciate the value of well-designed research and feel that researchers' interests may not align with their own).

Part of the solution to these problems is about developing better understanding of the different perspectives of those involved (Reid et al, 2016). Whereas scientists attempt to form objective conclusions in a given set of circumstances (and at the risk of not being able to be conclusive), the manager in industry needs to make a practical decision, often in spite of uncertainty in the evidence (Lewens, 2007). Neumann et al (2012) have explained how generalised knowledge of science is insufficient for successful change and needs to be absorbed and combined with the existing experienced based knowledge from practitioners in organisations. Action Research (Neumann et al, 2012) or participatory ergonomics to embed human factors in organisations (Wilson, 2014) are promoted as ways forward for researchers to work collaboratively with stakeholders. I have very much appreciated the analogy provided by Francois Daniellou, of the need for "researchers with dirty hands" – placing researchers on the beach with

the people, rather than viewing the people from the clifftop[2]. In this analogy, researchers also need the ability to take the people to another viewpoint (e.g. mountain top). Elements of this close working with industry are evident within our projects. In Project 5, an industry partner leads the project and the motivation comes from the desire to market products. The industry is open to expertise of the researcher and potential value of scientific input. Researchers benefit from the commercial focus and clarity in priorities of the industry partners, but must be willing to be flexible and compromise, without sacrificing rigour, to reach a mutually agreeable solution.

A second set of considerations relates to the differing capabilities and limitations within these groups (Dempsey, 2018). There are different job demands and needs across industries, and different knowledge, experience, backgrounds and education, within and between researchers and practitioners. Whilst it is right to consider the differences between research and practice, our experience indicates that there are also within group differences. As such, all partners in collaborations will lie somewhere on a continuum from pure research to pure application. We shouldn't expect to unify or reconcile these differences and influences and the diversity has to be considered as an opportunity. We all need to reflect and be open about our weaknesses, in addition to promoting our strengths, and be receptive to new ideas and viewpoints (Ulrich, 2004) in order to find practical ways forward.

3.3 Viewing HOF as a Method or Analysis Tool to Understand the Reality of People at Work or Interacting with Systems

HOF should not just be viewed as a body of knowledge. The research projects have valued the description of work and contexts ("what people do"), usually as a part of achieving other project objectives (e.g. safety analysis

[2] Residential seminar held in January 2018 in Royaumont, France, which has led to this book (Editor's note).

or implementing and evaluating safety interventions). This description has placed an emphasis on "work as done" (Hollnagel, 2014) and taken account of the wide-ranging stakeholders/organisations involved in running, maintaining or using the operational railway, and "listening to the people" at the front line to support better decision-making. It was heartening to hear that this was also recognised by the managers of organisations ("people matter more than structure", Project 3).

Our interactions with industry have also been designed to give a new view (for example using agent-based simulation, Perkins et al, 2015), showing possibilities of what could happen. Our outputs are often in the form of simple, descriptive accounts, presenting findings from field studies in text, tables and figures. Findings can be represented in new ways, not necessarily collecting new data, but collating and compiling what already exists. This needs effort and time to do what others have not, looking again at the evidence, to make new connections in the data and help others to see what we can see. One of the challenges has been how to collate and analyse the findings in ways that are useful to both the academic and industry communities. There is a case to be made for developing better metrics and measures for the study of HOF and these are often preferred by managers and engineers. However, the value of qualitative data in research and practice is evident (Hignett & Wilson, 2004).

There are circumstances when application of our research methods needs time. For example, the evaluation studies (Projects 2,4) and longitudinal studies (Projects 2,3) benefit from the nature of the part time PhD process and ability to track projects over lengthy time periods. This is exposing how change in business policy and practices can impact on the implementation and success of safety programmes. However, there have been situations where we have not been able to respond to the required pace of change (Project 1). We have also encountered situations where the industry has recognised how they have underestimated constraints on the speed or implications of change (Project 3). This introduces interesting questions about the existing approaches of researchers and industry staff in programmes of this nature.

4 CONCLUDING THOUGHTS

The three observations offer directions for future research and practice. All work needs to operate within constraints (e.g. costs, resources, time available). However, we need to continue to promote our values and retain our disciplinary identities, especially around the importance of considering people, improving safety, life and health, otherwise we will be pushed further along routes that we do not want to go. The way of doing this is not clear, though success is likely to be found in identifying better ways to work together (especially researchers and managers), considering all business functions and all phases of exploring problems and implementing and evaluating solutions. Developing a better understanding of the different perspectives and capabilities/limitations of our partners is essential.

HOF scientists and practitioners are a body of many disciplines and backgrounds and this diversity has to be a positive thing. We need to look more carefully at the nature of our engagement and how we seek to collaborate or embed HOF in our workplaces. There have been some compelling arguments for better measures and metrics. However, we must not lose focus on collecting and articulating details of the context (i.e. looking harder, looking differently or showing others what we can see) and developing the qualitative examples and case studies that can be used in timely and practical ways by industry to start working on their immediate needs.

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