Irizar, Jose and Wynn, Martin G (2014). Centricity in Project Risk Management: Towards a Conceptual Framework for Improved Practice. CENTRIC 2014 : The Seventh International Conference on Advances in Human-oriented and Personalized Mechanisms, Technologies, and Services 83 - 88

Centricity in Project Risk Management: Towards a Conceptual Framework for Improved Practice

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***Abstract* – Most organisations engage in major projects during their life cycle, and effective project management is increasingly accepted as a necessary competence in larger companies. Nevertheless, a considerable proportion of projects continue to fail to meet their due dates, exceed budget, do not deliver to specification, miss quality standards, or fall short on customer expectations. The effective management of project risk is a major component of this problem, and central to its resolution, and yet the theory of risk management remains relatively undeveloped and its practice is often poorly executed. This paper examines how the concept of centricity can be applied to some key elements of risk management to develop a conceptual framework that highlights some of the shortcomings of current practice and suggests alternative ways forward. This model will be tested and evolved through primary case studies of risk management in major projects in the automotive industry.**

Keywords - project management; centricity; risk; risk identification; risk management; risk assessment; subjective construct; conceptual model

I. INTRODUCTION

Project management is part and parcel of business operations in a wide range of industry sectors, including information technology (IT), engineering, construction, education, and health management [1]. It is now viewed as of strategic significance, and the management of risk is an integral part of the project management process. Despite the recognized criticality of project success for organizations, a considerable proportion of projects continue to either not meet their due dates, exceed budget, do not deliver to specification, miss quality, or do not meet customer requirements.

Project failure remains an area of considerable interest in contemporary project management literature, and effective risk management has been identified as one of the major criteria for project success [2]. Yet it remains an area where there is neither a clearly defined theoretical underpinning nor an agreed approach to support the development of a universally agreed method for managing risk. Nevertheless, risk management has become a central component of some of the most widely deployed industry standard methodologies, such as Project Management Body of Knowledge, PRINCE2®, Systems Development Life Cycle, Integrated Capability Maturity Model, and Information Technology Infrastructure Library. Comprehensive risk management increases the probability of project success [3]. It is considered as the means by which the effects of unexpected events can be limited, or even how such events can be prevented from happening. Risk management, as an integral component of project management, can make a significant contribution to overall project success [4]. This article attempts to develop some new directions in this debate through applying the concept of centricity to a number of themes that run through existing risk management literature – risk identification, risk assessment, and the nature of the management process itself. The overall aim of the research is to assess the validity of centricity as a key concept in the development of project management practice. This will also inform policies aimed at enhancing current project risk management, particularly in the automotive industry.

This introductory section is followed by a discussion of the theoretical framework for this paper. The application of the centricity concept to different aspects of risk management is presented in section three, and this is further developed in an analysis section which examines the implications of this model for contemporary risk management practice. Finally, the concluding section summarises results to date and looks at how this research can be further progressed.

II. THEORETICAL FRAMEWORK AND RESEARCH METHOD

The risk management process is often viewed as comprising five main activities (see Figure 1) [5], and this provides a useful frame of reference for this study. Our focus

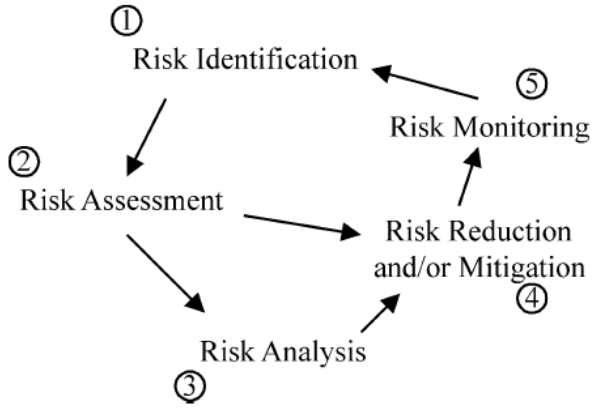

Figure 1. Generic overview of the risk management process

 ISBN: 978-1-61208-369-8

is on risk identification, and then risk assessment; and finally, we look at the process as a whole, comprising all five activities.

Risk identification is the starting point for risk management in projects, and the way in which risks are identified is considered to be a major influencing factor in project outcomes [6]. There are two main schools of thought regarding risk identification – "risk as an objective fact" and "risk as a subjective construct". The former considers risk as epistemologically probabilistic, whilst risk in the subjective construct perspective allows multiple epistemological dimensions of risk [7]. "Risk as an objective fact" considers risks to objectively exist. In the case of "risk as a subjective construct" risk phenomena are subjectively constructed by observers themselves. Risk as a subjective construct may thus be considered to be "person-centric", originating from a subjective perception of risk, rather than from an objective assessment of whether the risk exists and the significance of it.

As regards risk assessment, the choice of a particular industry prescribed project management methodology can have a major impact on how risks are assessed, and on overall project outcomes. Project management methodology can be defined as the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements [8] or, using the widest definition given by Cockburn [9], anything that the project management team relies on in order to successfully deliver project results.

All of the mainstream methodologies have their own techniques and tools for assessing risks. These methodologies include the Project Management Body of Knowledge (PMBoK), Project Risk Analysis and Management (PRAM), PRINCE2 and the Scrum Agile Standard. The first three of these are generally considered to belong to the so called traditional project management approach, whilst Scrum is the most prominent of the new project management approaches [9].

PMBoK, published by the Project Management Institute (PMI) is the project management guide most widely followed by international organizations. PMI's outreach, its proximity to project management core theories and formalization of processes compared to the other standards, make it to the optimum standard guide for many authors [10]. One major criticisms of PMBoK is its mechanistic approach, making it suitable for routine or technical situations [11], but not so appropriate for unusual or one-off situations. The methodology entails the use of its Probability and Impact Matrix for qualitative risk assessment. Some authors, such as Chapman and Ward [12], challenge the value of this tool for risk assessment. The experience of the risk assessor can determine the so-called probability estimate starting values, and thus estimates become biased. This effect is known as "anchoring" [13].

The development of risk matrices for assessment has taken place isolated from academic research in decision making – risk matrices produce arbitrary decisions and risk-management actions. These problems are difficult to overcome because they are inherent in the structure of the matrices [14]. Their theoretical basis is superficial and the validity of the qualitative information they employ is highly suspect [15]. The use of risk matrices for assessment illustrates the potential impact of project management methodologies on risk management and project outcomes.

Looking at the risk management process as a whole, many risk management professionals see the control of risk management as being dependent on the project manager. This leads to the conclusion that the effectiveness of the risk management process depends on the project manager's skills, experience and management style [16]. This can be viewed as project-centric risk management, with the project manager seen as the key individual in operational delivery of project outcomes. An alternative perspective highlights the criticality of allocating risk ownership to a range of individuals, who may not be in regular contact with the project manager [17]. Practitioners' responses suggest that an alternative system that encourages all project members to participate in the risk management process is normally missing. The consequence is the failure to create a collective responsibility to manage risk [16].

The aim of this research is to explore how the concept of centricity can be applied to the three dimensions of risk management discussed above. Centricity in a managerial context can be defined as the mind set or attitude that characterises the managers or organisation's outlook and motivation in the relationship to others [18] [19]. In recent years, qualitative research has found increasing recognition in many areas of project management practice. A large number of empirical studies using qualitative data are available in academic literature and specialized journals [2][4][6]. At the same time, management researchers and practitioners in particular rely on evidence-based policy. In fact, most of the existing generally accepted standards in the project management field as a whole are built around evidence-based policy and best practice.

Through an analysis of existing literature, allied to empirical data and observations in large project environments, this paper looks to develop a conceptual framework for research in the following areas:

- Person-centric risk identification vs. objective risk identification
- Methodology-centric risk assessment vs. multi-disciplinary/eclectic risk assessment
- Project-centric risk management process vs. devolved risk management process

This approach assumes that it is feasible and sensible to cumulate findings and generalize results to create new knowledge. The application of the centricity concept to the aspects of risk management discussed in this paper will be tested and developed further through primary research case studies as part of an on-going research project.

III. CONCEPT DEVELOPMENT

The identification of risk as a subjective phenomenon coincides with its creation – the risk exists only once the stakeholder has identified it. This is particularly noticeable for risks linked to an organization's own qualities and deficiencies [20]. This subjective or person-centric risk

identification can often produce inefficiencies in the management of risk that may impact detrimentally on project cost and overall project success (see Figure 2).

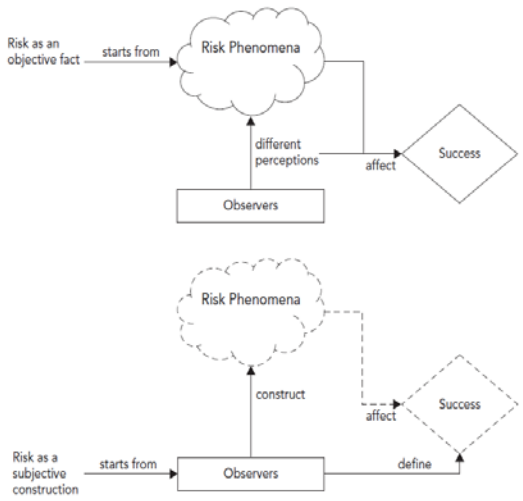

Figure 2. The two means of risk identification [7].

If we now view risk identification against risk assessment, it is apparent that most projects adopt a person-centric approach to risk identification and adopt a methodology centric approach to risk assessment. Yet we suggest that a combination of objective risk identification and eclectic risk assessment is likely to produce the most successful project outcomes (see Figure 3). The use of risk matrices for risk assessment illustrates this well. Their apparent simplicity and transparency are reasons for their popularity; however, they potentially entail serious mathematical defects and inconsistencies. Different risk assessors may assign greatly different ratings to the same exposure [21]. Such different ratings are due to fundamentally different worldviews, beliefs, and other psychosocial factors, the consequences of which are not minimized through reflection and learning.

There are a number of evident shortcomings in the use of these matrices. These include instability resulting from categorization differences, and the lie factor, which suggest that they can obscure rather than enlighten communication. The ranking produced was shown to be unduly influenced by the matrix design, which is ultimately arbitrary. It is suggested that other means of assessing risk based on decision-analytical methods could produce improved outcomes [14]. Marmier, Gourc and Laarz [22] present a decision-making tool in order to help the project manager choose the best way to improve project success rate while controlling the level of risks. Other authors combine the content analysis with cluster analysis or decision trees to build risk management guidelines [23]. These scientific decision analysis tools could be an alternative to the popular but inefficient use of risk matrices for risk prioritization. The establishment of systematically maintained lessons learned datasets could also provide quantitative reliable data to estimate the likelihood of potential events.

If we now examine risk identification in conjunction with the nature of the risk management process, a similar picture emerges (see Figure 4). The different approaches to the risk management process often appear as a conflict between centralized project risk management and the empowerment of sub-project teams [24]. The complexity of certain projects makes it difficult to understand the consequences of central decisions for the team members. The project manager alone will struggle to comprehend the details of all potential risks, oversee these and control their management. Yet most projects are project centric in terms of risk management process and person-centric as regards risk identification. The ongoing monitoring and maintenance of the risk register in which project risks are listed tends to be controlled by the central project manager [25]. It is suggested that overall project outcomes would be improved by appropriately combining centralized and decentralized risk management

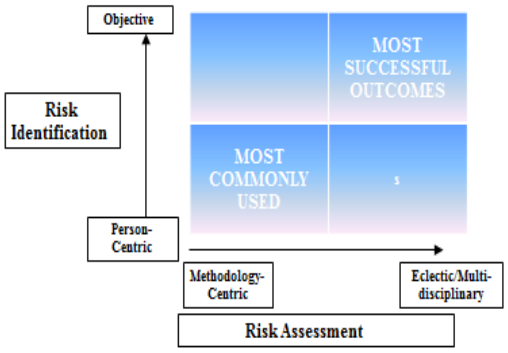

Figure 3. Risk identification and risk assessment: basic model

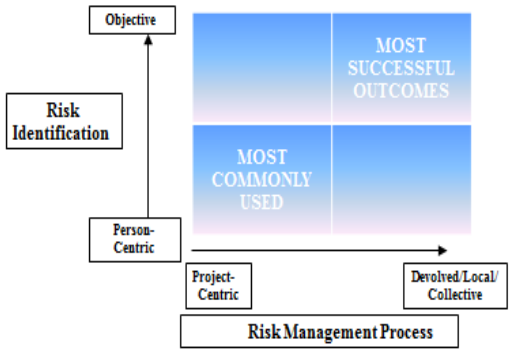

Figure 4. Risk identification and the risk management process: basic model

 ISBN: 978-1-61208-369-8

activities, especially in complex projects [16]. More particularly, project management practitioners in industries which require intense collaboration - such as automotive product development - complain about insufficient development of risk management methods and about methods and processes not being integrated and synchronized. Lack of collaborative risk management, together with miscommunication, is the main reason for project failure in the automotive industry [26].

IV. MODEL PROGRESSION AND IMPLICATIONS

The basic conceptual model can be developed further in the light of literature analysis and project experience, indicating the downsides and upsides of operating in each quadrant of the model (see Figures 5 and 6). This also has implications for the use of some of the mainstream project management methodologies in their treatment of risk issues. For example, PMI's project management guide, although considered as the best in class among all available

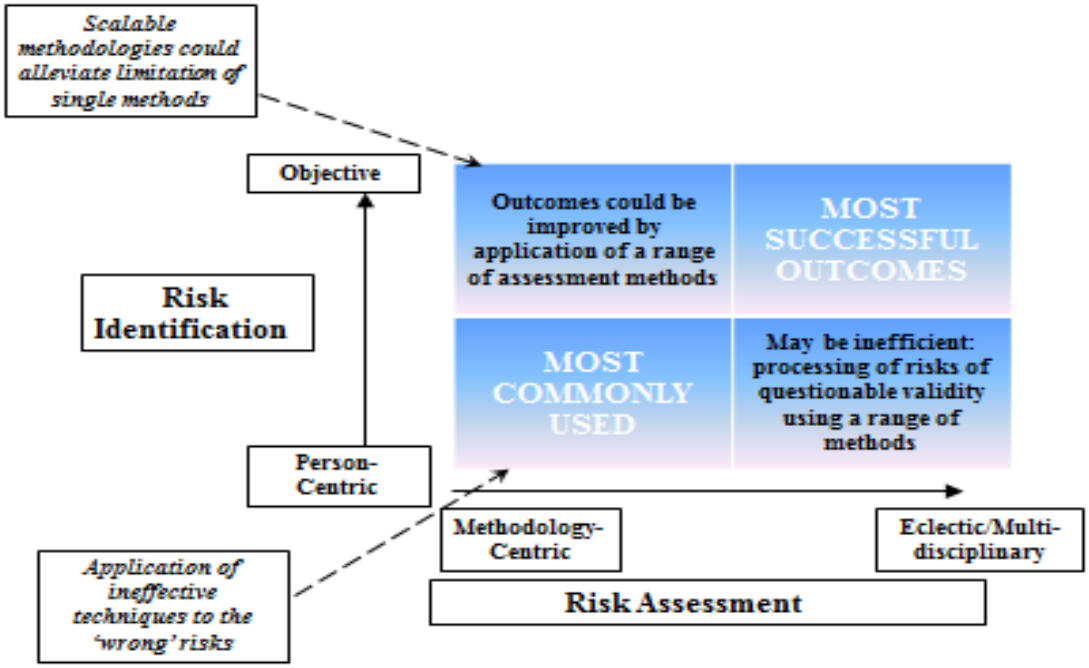

Figure 5. Risk identification and risk assessment: model development

Similarly, in major information systems projects, the IT function has traditionally owned and lead information risk management and security operations. However, the move to user ownership of systems requirements, process change issues and data access and maintenance, have changed the risk and security paradigm. Business managers, systems users and the IT function are now required to understand and learn others risk-reward trade-offs. The IT function must now share ownership of the risk management process and transfer accountability for some key areas of risk to business partners [27].

As Peter Drucker has put it, "when intelligent, moral, and rational people make decisions that appear inexplicable, it's because they see a reality different to the one seen by others" [28]. This phenomenon, in the case the risk management process, requires further research into the interaction and communication between project teams and their contexts. If it can be successfully harnessed to enhance the risk management process, it has the potential to significantly enhance eventual project outcomes.

methodologies and guides, could be enhanced with some early risk identification tools and techniques from more minor project management methodologies such as Scrum. Such enhancements would help reduce project uncertainty. In addition, experience gained by specific industries' customized methodologies can increase risk management effectiveness. These could provide quantitative data to support estimations of the probabilities of risks occurring. Equally, decision analysis tools are an alternative or complement to the inconsistent but widely used risk matrices. Decision analysis tools may be initially difficult to adopt; however, they can provide objective data to support risk assessment as an alternative to the use of risk matrices with all their inherent deficiencies.

The popularity of new project management approaches, such as that embodied in Scrum, resides in their adaptability to accommodate change and the unexpected, as opposed to the quest for risk predictability which is the basis of the traditional approaches [9]. These new approaches also highlight the importance of both formal and informal

 ISBN: 978-1-61208-369-8

communication, collaboration between project team members, and their involvement in decision making, suggesting a more devolved and collective risk management process is generally beneficial.

Context, such as the projects organization's size and complexity, may play a significant role in tailoring and adapting any project risk management methodology when applying the different standards. Generally speaking, the traditional approach is more appropriate for projects with very low level of uncertainty in which emphasis will be on planning. Conversely, agile project management, with a more flexible approach to a collective risk management process, fits best in environments characterized by a high level of uncertainty [9].

The two standards with a higher emphasis upon early risk identification are PRINCE2 and Scrum. Traditional project management practices struggle to deal effectively with uncertainty. In highly uncertain environments, approaches such as Scrum and lean methods can help manage residual uncertainty about risk not addressed by traditional project management practices [29].

The model developed using centric concepts suggests a combination of risk management based on traditional standards and more flexible approaches typified by Scrum would be beneficial for most projects. However, this would imply significant mindset changes in the organisation [30]. Project teams need to be empowered to effectively use a range of different methodologies and techniques, which may involve team members adopting new roles. This may result in teams creating their own, tailored, risk management process and activities [31].

V. CONCLUDING REMARKS

This article has explored how the concept of centricity can be applied to some key aspects of project risk management to aid understanding and develop alternative perspectives. The concept of centricity has been used as a key component in the development of a conceptual model that will now be tested and refined through primary case study research of risk management in information technology and new product development projects in the automotive industry. This will entail action research through which the conceptual framework will be applied and further developed in major pan-European projects.

Harnessing and applying the concept of centricity suggests that, in most projects, risk identification is person-centric, risk assessment is methodology-centric, and the overall risk management process is project-centric. Yet current literature, recent trends and personal observation suggest that a move away from centricity in these components of risk management would benefit project outcomes. The integration of traditional and agile project management to tailor project management methodologies to

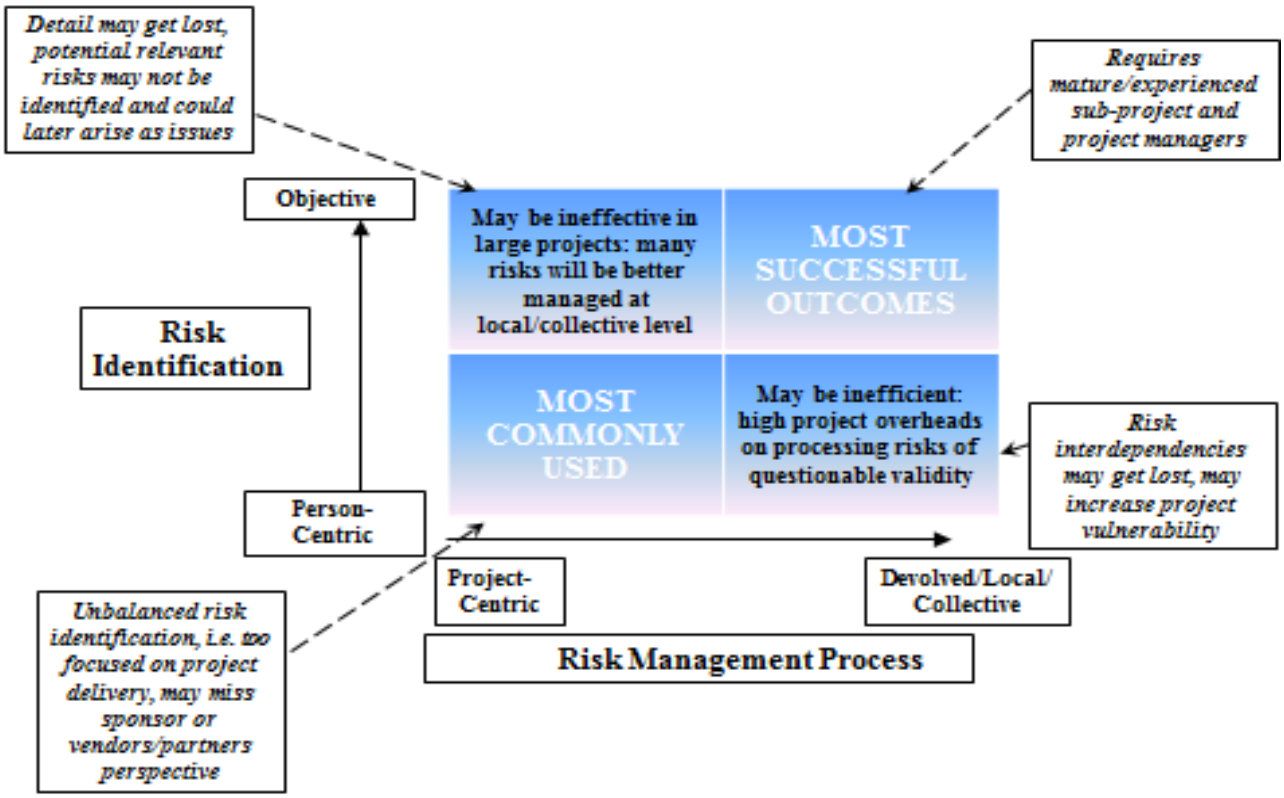

Figure 6. Risk identification and the risk management process: model development

the specific needs of the organization is gaining wide public attention. For the project manager considering how to manage overall risk, the question is not just which project management risk approach should be adopted, but more how to select a "best of breed approach", choosing the most suitable techniques, templates, tools and artifacts out of the different standards and methodologies. It is hoped that this article, by using the concept of centricity to analyse current practice, will engender this process and lead to better overall project outcomes.

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