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THE IMPACT OF CONTEMPORARY INNOVATION MANAGEMENT TRENDS TOWARDS THE ORGANIZATION OF IT PROJECTS

O impacto das tendências contemporâneas na gestão da inovação em direção à organização de projetos de TI

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Abstract: : Innovation failures when properly understood will support to improve the understanding of innovation success, which will help management improve their strategies. The objective of the research presented in this paper is to explore the efficiency in the organizing of innovative IT projects in the Sri Lankan context.Grounded Theory was used as the central methodology for this qualitative research study, where data was collected through open-ended questions based interviewing of corporate informants. An analytical tool, MAXQDA, which is a software that supports the analysis of qualitative data was used to electronically store, document and structure all interview transcripts.This research has found that the ordering of aspects of innovation management that influence the organisation of IT projects to be Reward Structure, Recruitment, Training and Development, Gamification, and Employee Empowerment; where Reward Structure had the highest code frequency per document and number of documents per code. For different innovation management methods, the ordering of the factors which influence the organisation of IT projects was further elaborated upon in this research. In the observation of 11 target organisations, it was found that there were no two identical innovation management implementations and each organisation provided a different experience. Data sources for the interviews were limited because the preliminary review of opportunities to study innovation management in the Sri Lankan context revealed that only a selected set of organisations would be relevant to the research. This research has important uses as only a small fraction of the existing literature attempted to establish any relationships between the variables Trend and Project Organisation. In order to introduce or improve innovation management in an organisation, the budget, needs of the organisation, how to introduce the implementation and investment evaluations need to be considered.

Keywords: Innovation Management, IT Project Organisation, Grounded Theory.

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Resumo: Falhas na inovação, quando entendidas adequadamente, podem contribuir numa melhor compreensão das causas do sucesso da inovação, o que ajudará a gestão a melhorar suas estratégias. O objetivo da pesquisa deste trabalho é explorar a eficiência na organização de projetos inovadores de TI no contexto de Sri Lanka. A Teoria Fundamentada foi utilizada como a metodologia central para esta pesquisa qualitativa, onde os dados foram coletados por meio de perguntas abertas com entrevistas de informantes corporativos. Foi utilizada a ferramenta analítica MAXQDA, que é um software que serve para análise de dados qualitativos, e que permite armazenar, documentar e estruturar eletronicamente todas as transcrições de entrevistas. A pesquisa constatou uma ordem de prioridades dos aspectos da gestão da inovação que influenciam a organização dos projetos de TI: Estrutura de Recompensa, Recrutamento, Treinamento e Desenvolvimento, Gamificação e Empoderamento dos Funcionários; de fato a Estrutura de Recompensa tinha a maior frequência de código por documento e número de documentos por código. Para diferentes métodos de gestão da inovação, a ordenação dos fatores que influenciam a organização dos projetos de TI foi aprofundada nesta pesquisa. Na observação de 11 organizações-alvo, constatou-se que não havia duas implementações idênticas de gerenciamento de inovação e cada organização forneceu uma experiência diferente. As fontes de dados para as entrevistas foram limitadas porque a revisão preliminar de oportunidades para estudar a gestão da inovação no contexto do Sri Lanka revelou que apenas um conjunto selecionado de organizações seria relevante para a pesquisa. A contribuição desta pesquisa é importante pois apenas uma pequena fração da literatura existente tentou estabelecer quaisquer relações entre as variáveis Tendência e Organização do Projeto; e sugere que a fim de introduzir ou melhorar a gestão da inovação em uma organização, o orçamento, as necessidades da organização, como apresentar as avaliações de implementação e investimento precisam ser consideradas.

Palavras-chave: Gestão da inovação; Organização de projetos de TI; Teoria Fundamentada

INTRODUCTION

Organisations should continuously strive to innovate in order to develop new products or processes. This is considered an important factor in order to survive in the IT industry and at the same time it is considered a challenging endeavour in the practical world. From the historical overview of innovation management after World War II, innovation was considered as crucial for the economic and technological survival of nations leading to a scientific research in innovation management (Ortt & Duin, 2008).

Innovation failures when properly understood will support to improve the understanding of innovation success. When the root causes for the failures are analysed, managers can intervene to reduce the future occurrences of such failures. Some of the reasons for innovation efforts to fail have been identified as inadequate customer focus or even innovations rejected by customers, employees not engaged in strategy, a disempowering culture of blame, with ineffectual communication prevalent and tolerated, ineffective teamwork, communication and collaboration, and suppliers not engaged or fail to deliver on requirements (Balmaekers, 2014).

This paper is organized in the following way. First, it provides a critique of the existing literature and shows how it contributes to this research study. Second, it describes the research methodology used for this research and thirdly, it presents the findings of this study. Finally, it offers conclusions and possible avenues for future research.

LITERATURE REVIEW

In past research work, innovation management and its impact in several areas were studied. However, such research was lacking in how it impacts to organise IT projects. Researchers have examined innovation management from various perspectives.

Cultural

Several studies have focused on organisation's innovation culture and climate (Ahmed, 1998; Sharifirad & Ataei, 2012). Drews et al. (2013) found out from the 14 semi-structured expert interviews carried out that IT innovation should not be limited to the management level but by establishing a culture of innovation would lead to a successful IT innovation management. Similar work in their view is presented in several studies (Ahmed, 1998; Martins & Terblanche, 2003; Schneider, Brief, & Guzzo, 1996; Steiber & Alänge, 2013). Whereas Drews et al. (2013) state that the innovation process should be formalized partially, the study by Steiber and Alänge (2013) reveal that it is not possible to have a manager in charge for innovation or formalize the innovation process as anyone could give ideas at Google.

Leadership

Numerous studies highlight the importance of support for innovation and have found that there is a positive relationship between an organization's culture on its innovation when the support for innovation is high (Ahmed, 1998; Choi et al., 2013; Sharifirad & Ataei, 2012; Stamm, 2009; Tushman et al., 2010). Leadership is the process of influencing others towards achieving a desired outcome (Jong & Hartog, 2007). In the qualitative study carried out by Jong and Hartog (2007), they interviewed 12 managers and identified 13 leadership behaviours that included innovative role modelling, intellectual simulation, stimulating knowledge diffusion and support for innovation. Previous research has focused on the importance of leadership for sustaining innovation in organisations (Jong & Hartog, 2007; Stamm, 2009). Whereas Steiber and Alänge (2013) have discussed the importance of selecting and developing leaders so that they could support innovative employees.

Organisational structure

An organisational structure is defined as the arrangement of responsibilities, authorities and relationships between people (Manning et al., 2006). A considerable amount of literature has been published on how an organisational structure influences innovation (Ahmed, 1998; Daugherty et al., 2011; Steiber & Alänge, 2013).

Organic structures promote innovation and mechanical structures hinder it (Ahmed, 1998; Arad et al., 1997; Martins & Terblanche, 2003). In the study on Google by Steiber and Alänge (2013), it was found that employee's innovative ideas were welcome through a bottom up process and clear goals and priorities were set from the top. In the study by Martins and Terblanche (2003), found that organisational culture has an impact on organisational structure. The values inculcated by the structure can encourage or limit novelty in organisations. Arad et al. (1997) also found that when employees are empowered to involve in decision making in problem solving, it is positively related to innovation.

Reward system

Lim and Ling (2012) defined a reward system as the package/system that contains rewards and benefits, e.g. holiday leaves, medical benefits, transport allowance and performance bonus. Several studies have revealed that organizations highlight individual based rewards in order to encourage innovation as variations in rewards can be justified based on performance and is a method to stimulate performance (Carneiro, 2008; Lawson & Samson, 2001). Amabile (1988) argues that money should not be used to bribe employees to generate novel thoughts. Ahmed (1998) discusses rewards under cultural norms that promote innovation. He also states that if rewards are not based on innovation but on task performances, employees will be cautious and hesitant.

Lawson and Samson (2001) stated that successful innovative organisations had reward systems that consisted of dual ladder systems, suggestion schemes, public recognition, and financial rewards. Whereas in the study by Steiber and Alänge (2013), it was found that the performance and incentive system was not a major factor behind Google's innovativeness. However, it served to recognize innovative employees. It was also found in the study of Google that the intrinsic motivation was identified as more vital for innovation.

Organisational learning

Whereas Steiber and Alänge's (2013) study on Google revealed that learning was vital for current products and process improvements than new innovations, Sicotte et al. (2014) found that innovation portfolio management need to build skills where learning would help them to be ahead of the competitors.

In the qualitative study by Duygulu et al. (2015), they interviewed 38 R&D official representatives consisting of R&D directors, managers and coordinators and found that learning and development is one of the major attributes of an innovative culture.

RESEARCH METHODOLOGY

Theoretical framework

The theoretical framework summarised in Table 1 was developed from the literature review and it lists the factors used for the study. However, from the full list of factors identified from the literature survey, some were not included in the theoretical framework. The reasons for those factors to be omitted are as follows:

The factor, employment growth is linked to innovation. Acs and Armington (2004) identified that employee growth has other factors affecting it. Therefore, measuring the contribution of innovation is difficult. The factor, growth in output is also linked to innovation. However, Fountas et al. (2002) found that it is influenced by other factors such as inflation and inflation uncertainty. Therefore, it is not suitable to be used in this study. The factor productivity will not be used as Feldstein (2008) states that it is influenced by rise in wages. Share of sales of new products was also not used because Cao and Li (2015) found that this factor is controlled by many variables such as advertising, working capital and competition. The factor firms' R&D investments was not used as Lai et al. (2015) found that it is influenced by financial autonomy, profitability degree, company size, capital structure, goodwill and patents, human resources and business resources. The factor firm size is not used because Kumar et al. (1999) found that it is influenced by other factors such as institutional factors consisting of the effectiveness of the legal system and financial market developments and also the amount of capital and the market size of the firm. Project size was also not used as Park and Papadopoulou (2012) found that it is influenced by cost and duration.

Participant recruitment

As the research design was intended to develop a theory as it emerges, theoretical sampling was used to recruit participants for the research on the basis of relevancy to the emerging theory. In this study a total of 14 participants who were relevant to the research area took part in the study. The individuals were a cross section of people directly involved in innovation - Heads of Research, Product Managers, Project Managers and Software Architects. The criteria for selecting the participants were based on their experience and knowledge in the research area.

Data Collection technique

For this qualitative research study, data was collected through open-ended questions to interview corporate informants to gather data to analyse perceptions of the participants with regard to innovation management in IT projects. The theoretical framework was used to develop the interview questions. Interviews were used to collect data as the participants' experiences can be thoroughly explored by conducting interviews. By using this approach, each organisation was assessed to see whether innovation is fostered using semi-structured expert interviews. The study included face-to-face interviews collected over a two-month period.

After a selected expert interview with a key person from one of the largest e-Health providers to see the validity of the questions, a series of semi-structured interviews was conducted. Each interview lasted approximately 45 to 60 minutes and was handwritten and later transcribed for analysis purpose. MAXQDA, a software that supports the analysis of qualitative data was used to electronically store, document and structure all interview transcripts.

Table 1 Summary of the Factors Used in the Theoretical Framework

Variables	Type	Dimensions	Measurement
Trend	IV	Cultural	Employee empowerment Gamification
		Leadership	Talent development
		Rewards	Reward structures
		Resources	Recruitment process
Project organisation	DV	Resources	Team distribution
		Leadership	Support for innovation
		Organisational structure	Type of organisational structure
		Rewards	Incentives for innovation

ANALYSIS

The data gathered from the open ended interview transcripts were analysed in a qualitative manner. Qualitative content analysis and Grounded Theory approaches (Glaser & Strauss, 2009; Miles & Huberman, 1994) were used in this research because the phenomena studied is specified in the interview questions and forms the basis for understanding why different innovation management trends and organisation of IT projects are used.

Analytical strategy for interview transcripts

The analytical strategy consisted of Grounded Theory (Glaser & Strauss, 2009; Miles & Huberman, 1994). For answering the questions: 1) what aspects of innovation management influences the organisation of IT projects and 2) for different innovation management methods what is the ordering of the factors which influence the organisation of IT projects, the following three steps were followed during the analysis (Miles & Huberman, 1994).
1) Data Reduction
2) Data Display
3) Drawing conclusions

Data reduction

In order to carry out the exploratory and inductive analysis of this study the 14 interviews resulting in 29 pages of interview transcripts and notes have been stored and analysed with the help of MAXQDA. In order to reduce the data, open coding (Glaser & Strauss, 2009) was followed and 59 codes that were grounded in 126 quotations were identified. In this step of the analysis a total of 291 code assignments were found and the reason for this was the multiple coding for a single quotation.

Thereafter, axial coding was used to link the codes to categories and sub categories that facilitated to reassemble the data and to form the theory. The coding scheme was refined by introducing several categories and sub categories. Next, selective coding was used to selectively add new codes and properties where required and further refine the categories and sub categories. The facility in the MAXQDA tool to add memos to the identified codes supported to structure the codes during data analysis. The creative coding feature, where a plain map is used to visually arrange the codes in MAXQDA was used to build categories from open coding.
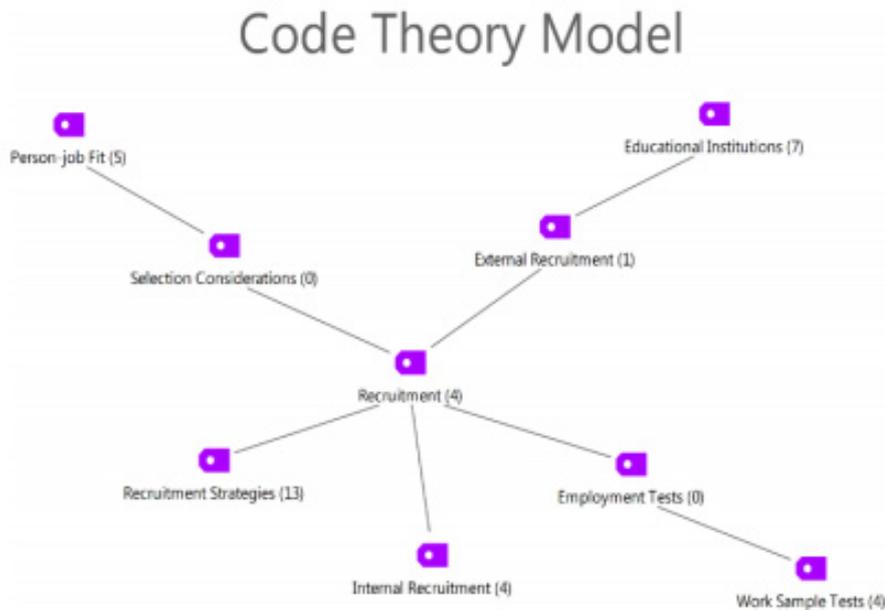
Code Theory Model

Figure 1   Code Theory Model – Recruitment

At the axial coding stage, the main categories identified initially for Recruitment were External Recruitment, Internal Recruitment and Recruitment Strategies. At the selective coding stage, the codes were then grouped and refined into 5 higher order categories and 3 subcategories as shown in Figure 1.

Data display and drawing conclusions

A variety of options to visualize data is presented using MAXQDA. In this stage of analysis, the responses for the research questions were reviewed. The questions were focused on the aspects of innovation management that influence the organisation of IT projects and for different innovation management methods what is the ordering of the factors which influence the organisation of IT projects. In order to protect the participants' anonymity, they were categorized according to their primary work responsibility into 3 areas and assigned with a code to represent them as shown in Table 2. The 3 main areas were Research, Engineering and Management.

Table 2 Study Participants

Codes	Description
E1	An Associate Software Architect at a prominent innovative financial technology business.
R1	Vice President - Research at a lean enterprise middleware company.
R2	Head of Research at a leading international travel solutions company.
M1	Director Advanced Services and TQM at a global technology innovation services provider.
M2	Director at a global technology innovation services provider.
M3	Manager Software Engineering at an e-Health provider.
E2	Team Lead - Client Managers at a cloud supply chain business.
E3	Head of Engineering at a leading telecommunication value added services specialist.
E4	A Technology Manager at a leading provider of software product engineering services to ISVs globally.
E5	A Software Architect at a prominent innovative financial technology business.
M4	Senior Manager Software Development at a global enterprise software company.
M5	Senior Manager of Human Resources at a leading restaurant industry solutions provider.
M6	Head and Director of Software at a global technology innovation services provider.
E6	Senior Director of Technology and Chief Software Architect at a global information technology services company.

The aspects of innovation management that influence the organisation of IT projects

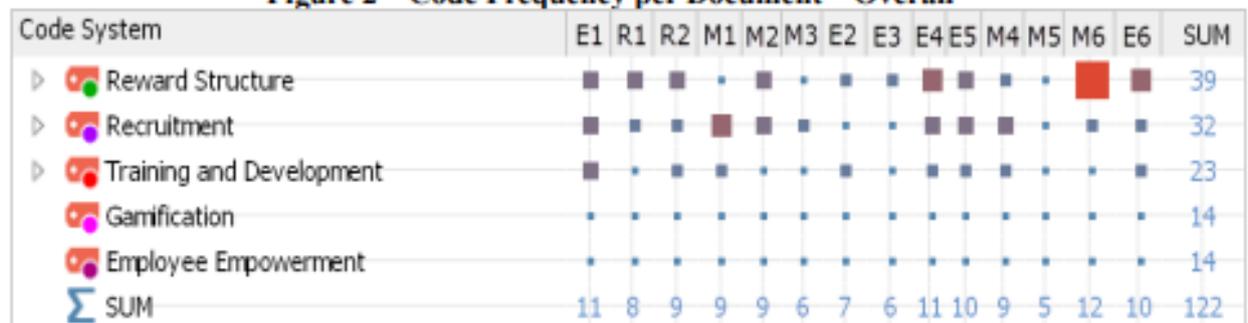Figure 2   Code Frequency per Document – Overall

Figure 3   Number of Documents per Code – Overall

As shown in Figure 2 and Figure 3, all codes have been related to the five trends of innovation management, with the highest density resulting for Reward Structure with 55 empirical groundings derived from 12 different codes. The second highest code was for Recruitment, with 38 groundings derived from 9 different codes. Training and Development received 27 groundings. Finally, Gamification and Employee Empowerment had only 19 and 16 empirical groundings respectively.

The overall ordering of the innovation management trends based on the code frequency per document and number of documents per code were as follows:

1) Reward Structure
2) Recruitment
3) Training and Development
4) Gamification
5) Employee Empowerment

For different innovation management methods, the ordering of the factors which influence the organisation of IT projects

Reward structure

Figure 4   Total Code Relations of Co-occurrence of Codes Between Reward Structure and Innovation Incentives

Figure 5   Number of Documents per Code Relations of Co-occurrence of Codes Between Reward Structure and Innovation Incentives

Figure 6   Total Code Relations of Near Codes Between Reward Structure and Innovation Incentives
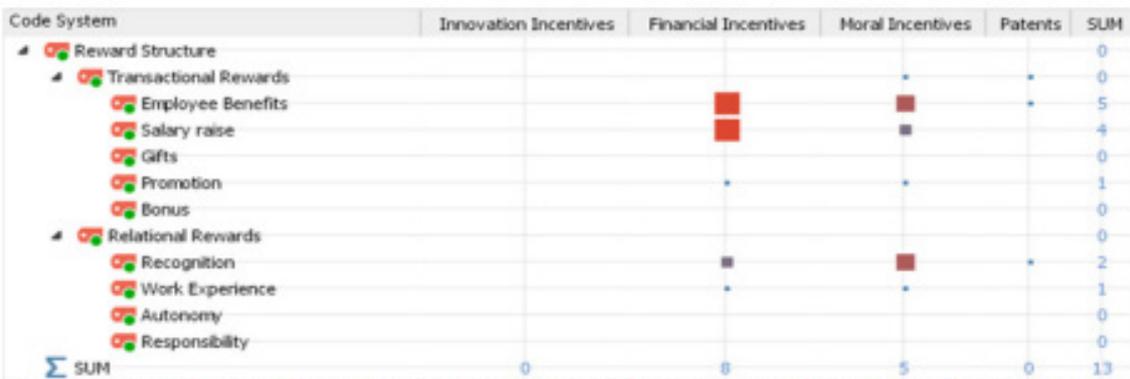

Figure 7   Number of Documents per Code Relations of Near Codes between Reward Structure and Innovation Incentives

The visualisations of the intersections of activated codes in Reward Structure and Innovation Incentives in a group of activated documents by using the MAXQDA Visual Tool - Code Relations Browser are shown in Figures 4, 5, 6 and 7. The Complex Coding Query feature with the following functions were used to retrieve code relations between Reward Structure and Innovation Incentives.

● If inside - Search for segments assigned to any one of the codes in Reward Structure that are also completely surrounded by a segment assigned to the code Innovation Incentives: 18 segments

● Followed by - Search for segments assigned to any one of the codes in Reward Structure that is followed by a segment assigned to the code Innovation Incentives within no more than 1 paragraph: 26 segments

● Near - Search for segments assigned to any one of the codes in Reward Structure that is preceded or followed by a segment assigned to the code Innovation Incentives within no more than 1 paragraph: 26 segments

The above results generated indicated that there were code relations between Reward Structure and Innovation Incentives.

Similarly, the factors Team Distribution, Management Support and Organisation Structure were compared with each innovation management method.

The overall ordering of factors which influence the organisation of IT projects for the innovation management method Reward Structures were as follows:
1) Organisation Structure
2) Innovation Incentives
3) Management Support

Recruitment

The overall ordering of factors which influence the organisation of IT projects for the innovation management method Recruitment were as follows:
1) Organisation Structure
2) Innovation Incentives

Training and development

The overall ordering of factors which influence the organisation of IT projects for the innovation management method Training and Development are as follows: Team Distribution, Management Support and Organisation Structure were at the same level.

Gamification

Only Organisation Structure influenced the organisation of IT projects for the innovation
management method Gamification.

Employee empowerment

Only Organisation Structure influenced the organisation of IT projects for the innovation management method Employee Empowerment.

Table 3 Summary of Comparative Analysis

Criteria	Dimension	Ahmed	Steiber and Alänge	Drews et al.	Martins and Terblanche	Research findings
• Employee engagement • Employee empowerment • Team work • Communication	Cultural	• Challenge and belief in action • Freedom and risk-taking • Trust and openness • Cross-functional interaction and freedom • Face to face communication	Innovation oriented culture	Establish a culture of innovation	• Behaviour that encourages innovation • Open communication	• Freedom to think • Work environment • Gamification
• Employee engagement • Employee empowerment	Leadership	• Leadership commitment and involvement • Innovation time and training	• Leaders as facilitators • Organizational learning • Selecting and developing leaders so that they could support innovative employees	IT innovation should not be limited to the management level	-	• Weekly innovation sessions • Sponsorships • Communities
Employee empowerment	Rewards	• Valued ideas • Respect for new ideas • Celebration of achievements • Suggestions are implemented • Encouragement	Performance and incentive system	-	Support mechanisms	• Transactional rewards • Relational rewards

Criteria	Dimension	Ahmed	Steiber and Alänge	Drews et al.	Martins and Terblanche	Research findings
Resource usage	Resources	-	Selection of individuals	-	-	• Recruitment process • Team distribution
• Customer focus • Supplier engagement • Employee empowerment	Organisational structure	Organisational structure: autonomy and flexibility	Lack of policies, structure and processes influenced innovation positively	The innovation process should be formalized partially	-	Type of organisational structure

Table 3 presents a comparative analysis of innovation management trends in the literature and the findings from this research on how organisations succeed by overcoming the challenges and failures in innovation.

CONCLUSIONS

Recommendations

From the observation done on the 11 organisations, it was found that there were no two identical innovation management implementations and each organisation provided a different experience. Designing an innovation management implementation for your organisation will require the careful assessing of the following:

● It is important to do a situation analysis on innovation management in the target organization sothat the strengths, weaknesses, opportunities and threats of the organization are identified.
● Also, it is important to assess the benefits the organisation would most value in receiving from the implementation.

Successful innovation management for a particular organisation will not be identical to other organisations. In order to introduce or improve innovation management the following is recommended:

1) The findings suggest that it is useful to determine where to invest the budget for innovation management.
2) It is important to build an innovation management implementation that meets the organisation's needs.
3) The implementation needs to be introduced in a way that the organisation accepts it.
4) Identify ways to evaluate the outcome of the investment.

This study revealed different innovation management trends and the results of such management approaches. In order for the innovation management model to successfully fit the organisation and to reap the benefits from the implementation to the organisation, managers should come up with different strategies.

Research limitations

The study encountered the following limitations with regard to building up the theory and to the empirical study.

Methodological and empirical limitations

Data sources for the interviews were limited because the preliminary review of opportunities to study innovation management in the Sri Lankan context revealed that only a selected set of organisations would be relevant to the research and a deeper study of management trends at each of these organisations to be necessary.

Theoretical limitations

The researcher identified significant gaps in the available literature. The variables Trend and Project Organisation had a lot of research relevant to it and independent of each other. Only a small fraction of the existing literature attempted to establish any relationships between these variables.

Future research

This study highlighted the impact of innovation management trends towards the organisation of IT projects. Several important findings were revealed. Suggestions for areas of interest for future research and development are as follows:

● Further study how giving more responsibility can contribute to innovation.
● Comparing innovation management in IT projects from a classless management perspective.
● Study how innovation management in IT projects could lead to organisational learning.
● Study the effect that motivation has on innovative IT projects.
● Researching how job performance can be evaluated in a way that contributes to innovation.
● Study how outdoor training can influence innovation management.
● Study how designations can contribute to innovation.
● The difficulties and challenges that have to be overcome to achieve innovation management success.

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