Interdependence and IS programme coordination and control

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Abstract

Programme management has been historically employed as preferred means for design, development and implementation of large, complex Information Systems (IS). An oft cited rationale of programme management is coordination across multiple projects and related operational activities. Coordination is an information exchange activity that allows stakeholders to gain control over interdependent programme activities. While coordination and control have been examined separately in IS project management context, there is a need to understand the process of their interplay. An important concept that links coordination and control is dependencies among programme actors, tasks and resources. We suggest a field study based exploration of dependencies in IS programmes that is expected to explain the process of coordination and control in IS programme and in doing so we can extend the coordination theory.

Keywords

Programme management, coordination, interdependence, control

INTRODUCTION

Programme management is an increasingly important phenomenon which has long been used in the development and implementation of information systems (Pellegrinelli 2011). One important reason for the existence of programme management is its ability to provide synergistic benefits through coordination of multiple projects, which are otherwise not available through managing these projects independently (Project Management Institute 2013b). Programme coordination, however, has only received passing references in practitioner literature and no comprehensive study of the phenomenon has been found. Likewise, control, and interdependencies have been studied in isolation in project and multi-team environments. Despite their interrelated nature no comprehensive study of the relationship between coordination, interdependence, and control has been conducted. In this paper we propose to investigate the role of interdependencies in coordination and control of IS programmes. Specifically, we are interested in understanding the process by which interdependence among various programme elements effects coordination and control. In the following sections, a brief overview of relevant literature is presented followed by a discussion of the need for further research, research objective and tentative research questions. We conclude by stating how we plan to conduct the proposed research.

PROGRAMME MANAGEMENT

The terms *project* and *programme* were used interchangeably in the early literature. Later on, programme management established itself as a distinct area of study in business and project management literature (Artto et al. 2009) and has been declared "a new discipline" altogether (Lycett et al. 2004). Programmes have been used in the information technology (IT) field for major systems development (Pellegrinelli 2011; Thiry 2002) as well as in a wide variety of other sectors (Partington et al. 2005). A programme can be defined as "a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually" (Project Management Institute 2008). Programmes are not to be confused with portfolios which are also collection of projects undertaken together but these projects do not necessarily share the same objective (Andersen et al. 2003).

In practice, it is difficult to make a clear distinction between a programme and a project. A decade earlier, Vereecke et al. (2003) observed that there is a disagreement on the definition of programme management which they attributed to the field being at early stage of development. A similar observation has been made recently by Young et al. (2012). Due to this reason it is difficult to provide a homogenous definition of programme management (Partington et al. 2005).

However, programme management is not just a scaled-up version of project management, because programmes include elements that are outside the scope of individual projects (Lycett et al. 2004; Maylor et al. 2006). Programmes are adopted to implement organisational transformational strategies and integrate multiple projects (Maylor et al. 2006). Furthermore, the role of programme managers is more strategic in nature and is outcome driven as compared to the project managers who are more task oriented and performance driven (Pellegrinelli 1997; Pellegrinelli 2002). While *hard* projects deal with deliverables or tangible outputs, the *soft* projects address less tangible aspects such as introducing "major changes in organisation, company culture and systems" (McElroy 1996, p. 326). In soft projects the objective and scope cannot be precisely defined at the launch; they rely on attitude and behaviours of those involved and interaction between project and the organisation in which they take place (McElroy 1996). Majority of projects now have significant soft components (Winter et al. 2006) and therefore, they are better candidates of programme management approach. Mega projects are considered programmes and managed as such (Rijke et al. 2014) because megaprojects typically consist of multiple components that can be classified as sub-projects (Pellegrinelli 1997).

In order to understand the nature of programmes we conducted a Grounded Theory based literature review following the five-stage method as suggested by Wolfswinkel et al. (2013). Initial selection of journals consisted of top ranked IS and Management journals [1]. Due to the specialised nature of the subject of programme management, review also included two project management journals for review namely Project Management Journal and International Journal of Project Management. Our review revealed that the majority of relevant work was published in the two project management journals. The literature review has been carried out only to develop theoretical sensitivity that would allow us to begin the first instances of data collection. We are interested in exploring the process of coordination and control and have chosen interdependencies as our starting point. However, since our proposed research will be based on Grounded Theory Method (GTM), the future direction of research will depend upon the concepts emerging from first slice of data collection. It may be the case that field data dictates the concept of interdependence that we identified as potentially important is not as important. In any case, we will divert our attention to the emerging concepts and will undertake appropriate literature review of those emerging concepts as we go along to remain true to the basic tenets of GTM.

Our literature review identified three distinct streams of programme management conceptions in the literature: programmes and projects as the same thing, programmes as collection of multiple projects, and programmes as strategic delivery vehicles. For the purpose of our research we consider programmes to be a combination of the latter two i.e. they are strategically important and comprise a number of projects and related activities. From the first stream we accept significantly large projects to be programmes.

Until 1980s the terms project and programme referred to the same thing and were used interchangeably (e.g. Andersen 1959; Cheek 1973; Cleland 1966; Fox 1984; Hill 1965; Morrison 1967; Paige 1963; Ramo 1965; Schoderbek 1965). Some authors consider programmes an outgrowth of projects with no additional characteristics. They believe all project-type work "displays similar characteristics (self-similarity)" (Gray 1997, p. 9) and therefore "programmes, projects, sub-projects, work packages etc. … are distinguishable only in terms of scale" (Gray et al. 1999, p. 362). This scale could be duration or the amount of investment involved. For example, Glaries (1999 cited in Lycett et al. 2004) suggests that any project of more than two year duration qualifies as a programme and Davies et al. (2009) consider a project requiring more than $1billion investment to be a megaproject which requires programme management. Archibald (1992) suggests that project management techniques can be applied to programme management without proposing any distinguishing feature. Programme definitions that subscribe to this view frequently use concepts of major project, long term effort, complex project, organisation-wide effort and cross-functional project. We have combined these concepts under the category "*significant-effort.*"

Others (Lycett et al. 2004) differ with the assertion that large projects can be considered programmes. Pellegrinelli (1997) suggests many projects are labelled programmes for achieving personal agenda while in fact "these so-called 'programmes' exhibit all the characteristics of projects" consequently the boundaries between project and programme are blurred and programmes are undertaken with "project level thinking" (Pellegrinelli

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[1] Eight journals comprising AIS Senior Scholars' Basket of Journals (http://start.aisnet.org/?SeniorScholarBasket last accessed 10/11/2013), plus A* Business and Management Journals from John Lamp's rankings (http://lamp.infosys.deakin.edu.au/era/?page=fordet10&selfor=1503) last accessed 11/11/2013.

1997, p. 148) which is dominated by costs, schedules, resource planning and strict adherence to methodical approaches.

Admitting the value addition potential of programmes, some authors declare that programmes are used to tie projects together in a multi-project environment. Sometimes, the objective of this grouping of projects under a programme is as trivial as facilitation of combined reporting to top management (Gray et al. 1999). But mostly this grouping provides the benefits of efficiency and effectiveness (Hatzakis et al. 2007) through inter-project coordination and management of shared resources and common technical platforms. A large body of literature supports this view (e.g. Elbanna 2010; Ferns 1991; Lycett et al. 2004; McElroy 1996; Pellegrinelli 2002). Programme definitions that subscribe to this view frequently use concepts of group of projects, efficiency, synergy, and related activities such as coordination, resource allocation, and interdependencies. We have combined these concepts under the category "*multi-project synergy*".

Some authors (Pellegrinelli 1997; Pellegrinelli et al. 1994) suggest that programmes can do more than grouping projects together and can provide a bridge between organisational strategy and projects. The strategic nature of programme management benefits was hinted at as early as 1990s (Pellegrinelli et al. 1994), and has been further developed by contemporary research. Programme management has been declared "a new discipline" (Lycett et al. 2004, p. 289) which is not just a "scaled up form of project management" (p. 294). Instead of focusing on project management oriented "technical and planning aspects", this new discipline focuses on "generative and organising aspects" (Pellegrinelli 1997, p. 141). These new aspects give programmes a new role where they act as a vehicle for change management and for implementing organisation's strategy (Partington et al. 2005; Pellegrinelli et al. 1994; Vereecke et al. 2003). Pellegrinelli (2002) asserts that in this role programmes enter into the domain of change management and organisation development theory.

In order to manage strategic change projects a set of tools different from traditional project management was called for (Grundy 1998) and programme management "as a bridge between strategy and projects" has been proposed as the answer (Pellegrinelli et al. 1994, p. 129). Programme management overcomes the problem of incorporating strategic learning achieved during the implementation of projects, by providing a framework which allows defining shorter duration projects of sequential nature (Pellegrinelli et al. 1994). While programme itself continues to adapt under the emerging learning, projects are largely shielded from continuous change in objectives and plans. McElroy (1995 cited in Grundy 1998) uses a hierarchical model to suggest a relationship between project and strategy which mediated by programmes.

The strategic nature of programme management benefits was recognised by one of the earliest formal programme management methodologies (OGC 1999 cited in Vereecke et al. 2003) and a large body of literature supports this view (e.g. Cash Jr. et al. 2008; Grundy 1998; Murray-Webster et al. 2000; Partington et al. 2005; Pellegrinelli 1997; Pellegrinelli 2011; Ribbers et al. 2002; Turner et al. 1992). Programme definitions that subscribe to this view frequently use concepts of delivering change, organisational goals, strategy, major benefits, cyclic/reiterative nature of programme management, changing business needs/adaptation, and programmes being the basis of project definition. We have combined these concepts under the category "*strategic intent*".

Attributes for effective programme management have been categorised as attributes for programme design and attributes for programme management processes (Shao et al. 2011; Shao et al. 2012; Shehu et al. 2011). The role of a programme management office is vital for programme management success, because it enables coordination of resources through programme governance, adaptation and coordination (Davies et al. 2014; Unger et al. 2012). Programme governance refers to the process of aligning internal programme stakeholders and anticipating external stakeholders so that the programme strategy is executed efficiently and value is added to the individual projects and programme as a whole (Beringer et al. 2013; Too et al. in press). Programme adaptation is needed to address or anticipate contextual changes (Ritson et al. 2011; Shao et al. 2011).

COORDINATION

Coordination has been defined as "the integration or linking together different parts of the organization to accomplish a collective set of tasks" (Van De Ven et al. 1976). Since coordination has not gained much attention in programme management field separately, understanding of coordination had to be obtained from organisation studies literature. Organizational research (Hoegl et al. 2005) declare that several barriers prevent groups and individuals from achieving coordinated action in organizations. Coordination requires mechanisms that support interaction and information exchange (Dietrich et al. 2013). Coordination can be achieved through the implementation of rules, written policies, standard procedures, and job descriptions which enable an integrated pattern of behaviour (Galbraith 1973). Different mechanisms for achieving coordination have been studied, such as the use of plans and schedules (Moenaert et al. 1990), reward systems (Menon et al. 1997), electronic mail (Markus 1994), electronic data management (Sicotte et al. 2000), output and behavioural control particularly in IS projects (Kirsch 1997), liaisons (Galbraith 1973), colocation of key individuals (Pinto et al. 1993), integrating

groups (Daft et al. 1986), direct informal contacts (Souder et al. 1992), workplace rotation (Ettlie 1995), individuals serving in formal coordinating roles (Nihtilä 1999), and the adoption of commonly agreed values (Hart et al. 1994).

Coordination mechanisms differ in formality, level of personal involvement, information-processing capacity, and use of technology (Daft et al. 1986; Rice 1992). Three different coordination categories have been identified: group mode of personal coordination, individual mode of personal coordination, and impersonal mode of coordination (Kraut et al. 1995; Van De Ven et al. 1976). The first two categories rely on the interaction of two or more humans while the impersonal coordination can be achieved through coordination artefacts such as plans, reports, rules, procedures, etc. Dietrich et al. (2013) identify the following three patterns in which coordination takes place.

1. *Centralised coordination*: most communication occurs through meetings of team heads i.e. through predefined formal roles in group mode
2. *Decentralisd coordination*: most communication occurs through individual mode among team actors across the teams at personal level.
3. *Balanced coordination*: where all three modes above are used but impersonal mode is given more importance here.

Malone et al. (1994) based their coordination theory on interdependence and defined coordination as the management of dependencies between activities. However, dependencies are very domain specific and the mechanisms needed to coordinate them are very context based (Shen et al. 2004). While proposing coordination theory, Malone et al. (1994) suggested some examples of coordination processes for managing dependency. For instance, shared resource dependency can be managed by "first come/first serve", priority order, budgeting, or market-like bidding. Prerequisite constraints can be managed by notification, sequencing, or tracking. They however declared that, their list of dependencies is not exhaustive and suggested developing context specific dependency based coordination theories in this regard.

CONTROL

Control has been defined as the effort employed to influence the individuals to behave in a manner consistent with organizational objectives (Henderson et al. 1992; Kirsch 2004; Ouchi 1978; Ouchi 1979; Ouchi 1980). Researchers have studied three kind of control, outcome, behaviour, and clan controls, which were first identified in Ouchi's (1978, 1979, 1980) seminal works.

Outcome control is exercised when targets or goals are pre-specified, individual outcomes are assessed, and rewards are based on whether the goals are achieved (Eisenhardt 1985; Ouchi 1978). Outcome control involves the definition of specific desired task or outputs. Controllers define appropriate targets and allow controllees to decide how to meet those output targets. Performance evaluation then focuses upon the extent to which targets were met, and not on the processes used to achieve the targets. To exercise behaviour control, behaviours are pre-specified, controlees are expected to exhibit these behaviours to achieve specific goals, and rewards are based on how well the behaviours are followed (Eisenhardt 1985). In behaviour control, controllers define appropriate steps and procedures for task performance and evaluate controllees' performance according to their adherence to the prescribed procedures. Behaviour and outcome control operate share a common underlying assumption that the controllers and controllees have incongruent goals, and they both align goals by providing appropriate incentives to the employees (Kirsch et al. 2002). Clan controls expect individuals to socialize according to a common set of norms and values. Rewards and sanctions are based on whether behaviour is consistent or not with these values and norms (Ouchi 1979).

Control modes are either "formal" or "informal". While formal control modes are formally documented and initiated by management, informal controls are unwritten and often initiated by employees themselves (Jaworski 1988). Therefore, formal control modes are exercised with formal mechanisms, and that informal modes are exercised utilizing informal mechanisms (Ouchi 1980). Researchers generally categorize behaviour and outcome controls as formal control modes and clan control as informal (Kirsch 1997).

DEPENDENCIES

Interdependence is the interactions between interdependent actors, work units or organizations that influence the allocation of resources and activities of one another (Lenox et al. 2007; Sorenson 2003). Malone and Crowston (Malone et al. 1994) explain their coordination theory of group action in terms of actors performing interdependent activities to achieve goals. These activities may also require or create resources of various types (Crowston 1997). Dependency can be classified in different ways. Malone et al. (2003) classify several types of dependencies and suggest using the ones that relate to any given situation. They suggest that other types of dependencies beyond their classification may also exist. Three commonly used dependency types are: sharing,

flow, and fit (Shen et al. 2004). Sharing dependency occurs when multiple activities need to use the same resources. Flow dependency appears when the output of one activity is the input of another. Fit dependency arises as the outputs of multiple activities need to fit into a single resource.

In one of the earliest discussion of interdependence, Thompson (1967) suggested following types of interdependencies.

- *Pooled interdependence*: each part renders a discrete contribution to the whole and each is supported by the whole
- *Sequential interdependence*. X must act properly before Y can act.
- *Reciprocal interdependence*: outputs of each become inputs for the others. Each unit poses contingency for the other.

All organizations have pooled interdependence, more complicated organizations have sequential as well as pooled, and the most complex have reciprocal, sequential, and pooled. Tan et al. (2012) modified interdependence types suggested by Thompson (1967) and added one more type, *Coopetition*, to reflect interdependence in a e-business context. Some other dependency types in Malone et al. (2003) classification are simultaneity, composition, and integration. Simultaneity dependency occurs when one task might require the concurrent execution of another task, or several tasks have to be performed all at the same time. In composition dependency both tasks and resources can be considered as forming decomposition hierarchies. Such higher-level tasks can be decomposed into subtasks. Integration dependency exists if multiple subtasks are performed to accomplish some effect, and it is necessary to integrate their results (Malone et al. 2003).

Since coordination can be seen as the process of managing dependencies, and each process is composed of activities performed by actors through consuming certain amount of resources, thus dependencies are related to activities performed by actors through consuming certain amount of resources. It is expected all dependency types identified by Malone et al. (2003) be present in IS programmes; there may be others which our field study may discover.

Work on understanding the role of interdependence in complex multi team projects has only begun (Hoegl et al. 2005). In the first ever academic study of programme interdependence, Parolia et al. (2011) demonstrated that resource interdependence positively influences programme success. They also hinted at the possibility of deliberately imposing resource dependence constraint to exploit the benefits associated with it.

MOTIVATION, OBJECTIVE AND RESEARH QUESTIONS

One of the rationales for existence of programme management is that it allows multi-project coordination which provides benefits beyond those available from each project managed independently (Archibald 1992; Cash Jr. et al. 2008; Ferns 1991; Gray et al. 1999; Hatzakis et al. 2007; Lycett et al. 2004; McElroy 1996; Partington et al. 2005; Pellegrinelli 1997; Pellegrinelli 2002; Pellegrinelli 2011; Pellegrinelli et al. 1994; Turner et al. 1992; Young et al. 2012). According to Cash Jr. et al. (2008) programmes ensure "that complex initiatives and changes dovetail with one another through the coordination of objectives, resources, and interdependencies." Coordination has been identified as one of the three requirements of effective programme management along with governance and adaptation (Davies et al. 2014; Unger et al. 2012). Programme governance has traditionally been an interest of programme management methodologies such as Project Management Institute (2013a) and Office of Government Commerce (2011) as well as academic research (Beringer et al. 2013; Too et al. in press). While Office of Government Commerce (2011) admits the importance of coordination for programme governance, it does not discuss this concept in depth. The concept of programme adaptation has also been studied recently (Rijke et al. 2014; Ritson et al. 2011; Shao et al. 2011). While coordination within teams   in a single project has been studied (Dietrich et al. 2013), programme coordination process has not received research attention.

Furthermore, there is conflicting advice in the literature which needs further explanation. Dietrich et al. (2013) have recommend using centralised coordination approach when project has more ambiguity and decentralised coordination when interdependence is high. However, since IS programmes have both high level of interdependence and ambiguity (Thiry 2002), it is not clear how these two aspects are combined in programme coordination. While proposing coordination theory, Malone et al. (1994) suggested developing context specific theories of coordination process to extend their theory to other areas. Crowston (1997) suggested that coordination process theories be further developed on the basis of the diverse kind of systems in which coordination occurs.

Programme management is increasing in importance and popularity and there has been a shift from "projectification" to "progmmafication" of organisations (Maylor et al. 2006). It has long been acknowledged that over 90% of project activity takes place in multiproject environment (Turner et al. 1992) thus it is very likely that programme management proliferation will continue. It has been suggested that although historically

the literatures on project management and program management have developed independently, in future there is benefit in considering the interplay between the two forms of managing change in organisation (Artto et al. 2009). Projects and programmes are now considered complimentary instead of competing methods, therefore, the study of their interaction and interplay is required (Pellegrinelli et al. in press). Literature has called for studying the relationship between programme and its constituent projects (Artto et al. 2009; Lycett et al. 2004) and the relationship between the temporary (i.e. programme in this case) and the permanent organisation that undertakes the programme (Artto et al. 2009). The need for industry specific research in programme management has also been highlighted (Artto et al. 2009).

IS programme management is an understudied area and the concept of dependencies in this context gains significance since one of the rationale of programme existence is to exploit synergistic benefits by coordinating dependencies among constituent projects through effective control measures. Even the very early text on interdependence suggested coordination mechanisms for different types of dependencies. Thompson (1967) suggested following coordination mechanism for the three interdependence types he described.

- *Standardization (pooled):* establishment of routines/rules that constrain action of each unit into paths consistent with those taken by others in the interdependent relationship.
- *Coordination by plan (sequential)*: establishment of schedules for the interdependent units by which their actions may then be governed. More appropriate than standardization for dynamic situations.
- *Coordination by mutual adjustment (reciprocal)*: transmission of new information during the process of action. This is coordination by feedback.

Interdependence in programmes hasn't gained much attention and available studies only deal with some aspects in exclusion but do not focus on the process of coordinating dependencies. For example Parolia et al. (2011) studied resource interdependence in IS programme management. However, their study is based on social interdependence theory and does not deal with the process of managing dependencies through coordination and control. Likewise, Dietrich et al. (2013) focused on identifying coordination patterns and their characteristics but they do not adopt a process model perspective. Therefore, there is need to understand the coordination and control process in IS programmes and we believe studying interdependencies will provide a good starting point in this regard. The end goal, however, is to establish a dependence based substantive theory of IS programme coordination. We expect to unravel the process by which dependencies at various levels of organisation and programmes affect the coordination and control process.

Our literature review revealed there is an overlap between coordination and control mechanisms. For example reward systems and sanctions, and social norms and values are elements of both coordination and control. One possible reason of this overlap could be that coordination and control are both efforts of managing dependencies. By focusing on dependencies, we may be able to get a better understanding of how these two concepts unfold and relate to each other.

Another difference in the proposed study and the past research is the unit of analysis. While previous studies used programme as the unit of analysis, we plan to study programme coordination from organisational point of view as well. This is more appealing given the fact the programme are strategic vehicles that seek to change the permanent organisation (Artto et al. 2009). Programme dependencies are much likely to exist both within and outside programme boundaries (e.g. programmes are more likely to be impacted by evolving organisational strategy as compared to projects (Thiry 2002)). This will also satisfy the call for researching the interplay between the organisation, programme, and project (Artto et al. 2009; Pellegrinelli et al. in press). However, our ability to study coordination at the organisational and programme level will depend upon the level of access we are able to secure, and the number of concurrent programmes being undertaken by the organisation we study. This will have major effect on the design of our planned research as researching at the organisation level will require access to the highest levels of organisational management. While more time consuming and difficult to negotiate, it is expected to result in a more significant contribution.

This research project has been proposed to address all the above issues by studying information systems programme coordination at two levels i.e. coordination between the organisation and the programme, and coordination within programme (i.e. between programme and its constituent projects and related activities). The objective of our proposed research, therefore, is to establish a substantive theory of coordination process in IS programme management practice. The specific research questions are: How organisational stakeholders use coordination to achieve control of interdependencies that may exist within and outside the programme? And how interdependence among programme elements affects coordination and control choices?

Approach and Methodology

The ontological and epistemological assumptions in this proposed research reflect our belief in the middle ground between the extreme positions on the nature of reality and knowledge in social science. Ontologically, we take a moderately nominalist (Burrell et al. 1979; Neuman 2011) or soft positivist (Madill et al. 2000)

position. We acknowledge the existence of social structures as pre-existing and given to an individual but reality cannot be understood in an absolute objective manner. Taking a critical realist position (Neuman 2011) we believe that our perception and experience of reality depends upon our pre-existing notions, subjective and cultural interpretations. Adopting a relativist approach (Mills et al. 2006), we also believe that social reality is partly constructed by humans through their interaction with each other and with their environment. This schizophrenic position of identifying with parts of multiple competing paradigms is consistent with recent authors like Brenda Dervin (Agarwal 2012) and Cathy Charmaz (2003); as both admit of being attracted to various concepts of modernist and post-modernist paradigms and seek the middle ground in between.

The above ontological position suits our research problem. While the programme itself exists within the organisation, governance structures and roles are given to the programme teams i.e. partly realist position. We intend to study if the interaction of programme team conforms to these structures or whether coordination is created by the interactions of the programme team individuals that go beyond these given structures i.e. if it is a relativist construction. It is our objective to see how the process of coordination comes into being as interdependence of actors, resources, and tasks involved in the process and the situations encountered. Epistemologically, this field research will adopt interpretive philosophy of IS research (Orlikowski et al. 1991) with constructionist orientation (Neuman 2011).

Research method and its suitability

We intend to use GTM for this research. GTM is an inductive theory building research method that generates substantive theory grounded in empirical data based on systematic exploration of a phenomenon (Glaser et al. 1967). GTM is an ontologically neutral method (Madill et al. 2000; Urquhart et al. 2006; Urquhart et al. 2013) thereby fitting well with our pluralistic ontological position.

The benefits of GTM for IS research include the method's capacity to interpret complex phenomena (Charmaz 2003), its accommodation of social issues (Glaser et al. 1967), its appropriateness for socially constructed experiences (Charmaz 2003) as well as the emergence of theory (Glaser et al. 1967). The issues of coordination of IS programmes and coordination of IS projects within an IS programme are of socio-technical nature. Fernández and Lehnmanm (2005) argue that for research to maintain most relevance in emerging areas of the socio-technical domain, researchers must adopt a new methodology and they propose GTM as the alternative. GTM has been declared a suitable method for studying the socio-technical milieu which form the subject matter of IS and has attained the status of a mainstream research method in this field (Birks et al. 2013). Furthermore, GTM is recommended when no prior theory exists for the phenomenon under study and the phenomenon involves process and change (Orlikowski 1993). GTM is particularly useful for our research objective since we seek to study the process of coordination in IS programmes for which no prior theory exists.

For the proposed research, the main source of data collection will be semi-structured interviews. Although the number of interviews cannot be pre-determined since the exact number will depend how quickly theoretical saturation of core categories is achieved but we expect around 30 interviews. We'll also undertake a thorough study of all programme related documents made available. At least one focus group at the start of the project is planned to get an overview what interdependence, coordination and control processes mean to the stakeholders. Data analysis will follow Charmaz's analysis and coding techniques as explained in her instrumental texts "Constructing Grounded Theory" (2006; 2014). This recursive and intertwined process of data collection and analysis is expected to take between 10 to 12 months. At the end of the field study and data analysis we intend to hold a workshop where results of our study will be presented to and validated by those who participated or are interested in the findings.

FUTURE DEVELOPMENT AND CONTRIBUTION

We have identified that programme have three important properties: they are significantly large investments; they attempt to exploit multi-project synergy; and are strategically important. An important reason of the existence of programme is the possibility of managing interdependencies among various elements of programmes through coordination and control. Programme interdependencies also exist outside programme boundaries. We intend to embark on a field study of IS programmes that will undertake a holistic study of coordination process in the increasingly important area of IS programme management. It will explain coordination process at two levels i.e. coordination of programmes by the organisation and coordination of constituent projects and other activities within the programme. We also expect to explore the relationship between coordination and control. For academia, it will contribute to the understudied area of IS programme management (Vereecke et al. 2003). For practice and consultancy domains, this research will provide a rich description of coordination process in IS programme context in addition to the theoretical conceptualisation at substantive level.

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