Heard it through the Grapevine:
A Small-Worlds Perspective on control as a package

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Introduction

Over the past three decades, reviews of management control research (Otley, Broadbent and Berry, 1995; Langfield-Smith, 1997, 2005, 2007; Chenhall, 2003; Merchant and Otley, 2007; Berry, Coad, Harris, Otley, and Stringer, 2009) have documented the escalating inventory of knowledge and theory development that has been accumulated in this area. Highlighted in these reviews has been the progression in the conceptualization of control from Anthony’s (1965) primarily formal, quantitative and accounting-based view, to one that embraces a more holistic perspective incorporating both formal management control systems (MCS) and informal controls collectively operating as a ‘package’. This more recent view suggests that multiple means of control interact with each other to complement, operate as substitutes, and also to act in opposition (Fisher, 1995; Abernethy and Chua, 1996).

Despite this more contemporary position, our understanding of how formal and informal controls interact remains limited (Malmi and Brown, 2008; Sandelin, 2008). This may be partly attributable to a tendency by researchers to focus on specific formal control variables (Chenhall, 2003; Luft and Shields, 2003; Berry, et al., 2009), the development and use of theoretical frameworks that focus predominantly on taxonomies describing formal MCS (Chenhall, 2003; Berry, et al., 2009), but also as a result of the difficulties associated in operationalizing or more fully understanding the self-regulating mechanisms central to the propagation of informal control (Berry, et al., 2009). Considerable attention in management control research has been directed towards examining informal means of control, yet although we recognize the incidence and appreciable influence of this mode of control, what is going on inside the ‘black box’ of informal control, how informal control is diffused, and, the ways in which this form of control interacts with formal MCS, is not an area that has been extensively considered in the management control literature. If it is accepted however, that management control does ‘act as a package’, then control models which selectively report, or exclude one component of the control package are, by definition, underspecified (Otley, 1980), making it difficult to identify how findings are linked and how they refute, complement or extend existing theory (Chenhall, 2003, p. 131). A failure to more explicitly identify how informal control operates within organizations
therefore constitutes a fundamental impediment obstructing the further development of management control theory. This paper is therefore principally motivated to explore how informal control may be overtly integrated within control models, to enable such models to be more adequately specified.

Although accurately measuring the incidence or pervasiveness of informal controls is notoriously difficult (Langfield-Smith, 1997), viewing a given organization as a collection of relationships and social interactions, may provide a conceptual vantage point that will enable informal control to be more adequately modeled and incorporated within control research. By its very nature, informal control is diffused through both formal as well as informal structures. Intrinsic to these formal and informal structures are a myriad of social interactions (Tichy, Tushman, and Fombrun, 1979), articulated via vertical as well as lateral networks (Scott, 2000). Such networks facilitate the transmission of a variety of information, for a variety of purposes (Krackhardt and Hanson, 1993), and may therefore represent the conduit or ‘ether’ through which informal control is diffused. As a theoretical perspective that directly views patterns and structures of relationships and social ties between individuals as comprising networks, Social Network Theory (SNT) offers a means to capture and analyze the dissemination of informal control throughout an organization. Although inroads have been made in applying SNT to management accounting research (Richardson, 2009; Chenhall, 2008; Masquefa, 2008; Chapman, 1998), limited attention has been directed to viewing management control from this theoretical frame of reference. Specifically, by engaging with the SNT literature, this paper contributes to developing management control theory by proposing an explicit means by which control models may recognize, identify and to an extent, quantify the role of informal control in an organizations’ overall control package. In so doing, it is argued that the influence of this form of control – both individually and in combination with formal MCS on the overall control package of organizations - may be identified, and therefore, better understood.

The remainder of this paper is structured as follows. The following section presents insights into, informal control as it has been addressed in management control research. The consequences of ignoring the role of informal control in management control research are discussed in the subsequent section. This is followed by an introduction to SNT and Small-worlds phenomenon as a tool by which...
the propagation of informal control may be analyzed and more adequately understood. Finally, reflections on the theoretical significance of the arguments presented are discussed, along with opportunities for further research.

**The importance and prevalence of Informal control**

Both formal MCS and informal controls are readily observable within organizations, yet what constitutes an ‘informal control’ is not easily defined. In contrast to formal MCS\(^1\), informal controls do not exercise control through explicit, verifiable measures and are not consciously designed. Rather, such controls reflect unwritten policies of the organization (Langfield-Smith, 1997), that serve to communicate rules, policies, procedures and targets informally to all employees. Informal controls involve loose structures and open communication through networks of relationships that employees form across functions and divisions (Krackhardt and Hanson, 1993). Means by which this communication occurs include shared values, beliefs, and traditions that guide behavior of employees (Falkenberg and Herremans, 1995); management style, informal dialogue and social forces (Marginson, 2002); and group norms and socialization (Collier, 2005). Thus, informal controls “often derive from, or are an artefact of the organizational culture” (Langfield-Smith, 1997, p. 208). As Chenhall et al., (2009) observes, the essential difference between formal MCS and informal controls is that the former are deliberately articulated controls, whereas the latter tend to involve less well defined practices and loose connections between elements of the controls related to decision making and communications.

**Integrating formal and informal control - management control as a “package”**

As control mechanisms may be formal, informal, or a mixture of both (Otley and Berry, 1980; Falkenberg and Herremans, 1995), different formal and informal control configurations may be used within an organization, in different combinations, at different times, and to different extents. Together, formal MCS and informal controls combine to form an integrated broader control framework, operating collectively as a ‘package’, the ultimate aim of which is to support organizational objectives,

\(^1\) The definition of formal MCS adopted is: “formalized procedures and systems that use information to maintain or alter patterns in organizational activity” (Simons, 1995, p. 5). This definition includes planning systems, reporting systems, and monitoring procedures which are based on information use.
control activities, and drive organizational performance (Malmi and Brown, 2008). Multiple means of formal and informal control do not only complement each other but also may operate as substitutes (Abernethy and Chua, 1996); as well as in opposition (Chenhall, et al, 2009).

Empirical studies that have observed the interrelationships and couplings between formal and informal control elements have generally pointed to the highly significant role of informal control in the overall control package of an organization (see, for example, Falkenberg and Herremans, 1995; Parker, 2002). These cases provide empirical support for the argument that formal controls constitute only part of broader control systems (Otley, 1980, 1994), moreover, they demonstrate that organizations have “great flexibility to choose the portfolio of controls that they expect to work best in their situations” (Malina and Selto, 2004, p. 444). While management control packages may look quite different, they have the propensity to, and often do produce equally good outcomes (Malmi and Brown, 2008). That is, equally effective control can be achieved by organizations from many different starting points, and along unique causal paths (Sandelin, 2008). Adopting a view of management control as a package suggests that interaction between formal and informal controls is unavoidable and common to all organizations. Equifinality of control therefore leads logically to the question of how ‘well’ this interaction occurs.

**Why does it matter? Potential consequences of ignoring informal control in the package**

Despite recognition of the concept of control operating as an overall control package, the need for further research into how controls are configured, and how the components comprising a control package actually relate to each other is important for further development of management control theory. If it is accepted that management control does ‘act as a package’, then control models which selectively report, or neglect one component of the control package (be that component formal MCS or informal control) are, by definition, underspecified (Otley, 1980). Such under-specification makes it difficult to identify how findings are linked and how studies support, refute, complement or extend existing theory (Chenhall, 2003). Moreover, studies which fail to incorporate the influence of informal

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2 This concept as it applies to management control is known as equifinality. The equifinality thesis originated in General Systems Theory (von Bertalanffy, 1968), and suggests that similar outcomes might be achieved by very different typologies or causal paths (see: Gresov and Drazin, 1997).
control, and the links between various MCS and informal controls may result in distorted findings are likely to lead to erroneous conclusions (Fisher, 1995).

**Informal Control – a “Black Box” in management control theory**

Notwithstanding the recognition of its significance within the overall control package, how informal control is propagated and diffused throughout an organization remains essentially a ‘black box’ in management control theory (Sandelin, 2008). Empirical studies have enabled us to describe what is coming out of the black box of informal control as well as what is going in, they do not necessarily reveal what is happening inside. We have yet to fully understand how, why and in what ways informal control is established, maintained, promulgated or works alone – or in tandem – with formal MCS. There is a need to examine both, the processes by which informal control occurs, and the structures that restrict and facilitate this mode of control. In the management control literature, there appears to be an implicit supposition that informal control is a ‘socially constructed’, highly subjective, organization-specific phenomenon which cannot be managed or systemized let alone measured. It is this view that is being challenged in this paper. Although analytical tools and theoretical perspectives to analyze and examine the use of formal MCS are well established, frameworks to examine the nature of informal control have been limited. The dearth of established conventions developed within the management accounting literature which might offer insights into the nature of informal control, has prompted in this paper, a search for viable theories beyond this particular literature which may assist in adopting more adequately-specified models of management control. In particular, the contribution of such theory should inform researchers on how informal control might be better understood, operationalized, and incorporated in its role as an integral component of an organizations’ overall control package.

Management control comprises two elements: an information network and a set of social relationships (Ansari, 1977). Therefore, a clear understanding of the structure of how such information networks

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3 For example, budget/social controls (Rockness and Shields, 1984); action/social controls (Merchant, 1985); administrative/interpersonal controls (Bruns and Waterhouse, 1975); action/results controls (Merchant, 1998); mechatronic/organic controls (Chenhall and Morris, 1995); tight/loose controls (Amigoni, 1998; Merchant, 1998; Whitley, 1999); restricted/relaxed/controls (Otley, 1994); impersonal/interpersonal controls (Whitley, 1999); social/clan controls (Abernethy and Stoelwinder, 1995); coercive/enabling (Ahrens and Chapman, 2004); bureaucratic/non-bureaucratic controls (Auzair and Langfield-Smith, 2005); levers of control (Simons, 1995).
interact with social relationships would seem to be an indispensable prerequisite to illuminate the contents of the ‘black box’, and in ensuring that control models avoid the problem of under-specification. One such frame of reference that may prove fruitful in explaining and predicting the nature and diffusion of informal control within organizations is Social Network Theory (SNT), and it is towards a consideration of this theoretical vantage point that the attention of this paper now turns.

**Social Network Theory and the Small-worlds phenomenon**

With origins in studies investigating patterns of communication, influence and interaction within social groups (Scott, 2000), SNT has been applied to small group research to examine the emergence and change of informal structures and patterns of relations (Burt, 2001). Predicated on a view that sees an organization as a combination of multiple overlapping networks of complex social and interpersonal relationships, SNT argues that social networks occur in hierarchical layers, formal organizational subdivisions such as departments or business units, as well as informal groups. The social ties comprising these networks are maintained over time, thus establishing a relatively stable pattern of network interrelationships (Brass, Galaskiewicz, Greve, Tsai, 2004). Directing attention to the structure of such networks, and the linkages and position of individuals within these networks enables the pattern of interactions and connections to be modeled and predicted (Richardson, 2009). Such networks can play a key role in the dissemination of information within the organization (Ferriera and Otley, 2009), and may therefore provide rich insights into how informal control may be established and propagated within an organization.

The use of SNT to map or at least shed light on the prevalence and effect of informal control however, is not without cost. As Chapman (1998) observes, even a relatively small organizational network may require monitoring of hundreds of possible relationships, making the ordering, interpretation and analysis of such information complicated. This level of complexity is likely to pose an investigative and evaluative challenge (Kilduff and Krackhardt, 1994), but theoretically, it can be shown that although individual ties grow geometrically as new participants are added to any given network, connections between participants, even in a network containing thousands of subjects, can be achieved with a relatively small number of relationships (Watts, 1999). That is, individuals are collectively very
effective at constructing short paths between two points in a social network, thereby optimizing information flows within such structures (Watts and Strogatz, 1998). This particular characteristic of social networks is referred to as the, ‘small-world’ phenomenon (and colloquially, the thesis of ‘six degrees of separation’). Networks exhibiting such small-world properties are observable in many different contexts, including computer science, biology, criminology, fashion, operations research, electrical engineering, neurosciences, and the social sciences (see, Barabási, 2002; Watts, 1999). These structures are argued to share a common blueprint and conform to underlying laws, based upon the propensity of small-world networks to self-organize.

Social networks organized according to small-world principles involve identifying clusters, and then connecting the clusters using central elements (nodes) within the clusters as reference points. Generally, a node may be considered to be a cluster made up of people; it can however include a committee, a task force, a professional body, or a department. Elements comprising the cluster are directly connected to all other elements within that cluster, with the whole cluster not being contained in any larger cluster, although individual members may belong to several clusters. Centrality describes the extent to which a cluster is structured around an individual node and also the extent to which an overall network is structured around particular clusters. It provides an indication of which individuals/clusters are at the centre of a given cluster/network and which are more peripheral (Chapman, 1998, p.743). Applied to social networks, the small-world phenomenon suggests that any two people irrespective of their social, economic or geographical proximity or hierarchical position, picked at random are connectable via a chain of not more than six intermediate acquaintances (colloquially termed, ‘six degrees of separation’). Having to service multiple ties becomes time consuming and is likely to result in collaboration fatigue which limits the amount of networking that is feasible. Therefore, the sparseness of the number of connections between ties is a strength of small-world forms as everyone does not have to maintain ties with everyone else all the time, and small-worlds network configurations avoid the problems of collaboration fatigue resulting from monitoring and servicing too many relationships.

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4 As it is used here, a self-organized structure is primarily one that does not require a formal, organizational hierarchy as a conduit through which control may be enacted.
Informal Control from a Small-worlds perspective

Strong empirical evidence exists to suggest that many social networks display the small-world effect (see, Stevenson and Gilly, 1991; Goodwin, Bowler and Whittington, 2009). One major conclusion that can be drawn from is that the conditions for small-worlds to emerge are minimal: a few highly connected individuals or random shortcuts are sufficient to render a highly clustered network connected with short average path links. In a management control context then, adopting a small-worlds perspective to SNT presents a way of observing and assessing means by which control may be promulgated and exercised in ways beyond that of a formal hierarchy, to include the role and influence of social ties and informal relationships in propagating informal control throughout the total network, and therefore, the role of this mode of control in an organizations’ overall control package. It is contended that small-world networks may be considered the ‘medium’ or ‘ether’ through which informal control is promulgated within organizations, both in isolation from, and in combination with formal MCS. The argument presented here is therefore, that these properties can be used to better understand, and therefore ‘manage’ informal control efforts. Small-world properties are characterized by dense clusters spanned by both formal and informal relationships that facilitate information flows, enabling a high level of connectivity across the network as a whole (Kilduff, et al. 2008; Kogut and Walker, 2001). Networks which do demonstrate small-world properties are likely to enable information flows to travel around the network with only having to maintain a limited number of links, thereby providing a means of depicting the capacity of informal control to be propagated via the organizational network, be it through informal means, or in conjunction with formal MCS. From a control perspective then, the challenge becomes one of how to structure social interactions in a way that optimizes control efforts. In principle such an argument may appear compelling; however the use of small-world metrics can provide a means to ‘operationalize the theory’.

Measuring the unmeasurable, managing the unmanageable?

The extent to which a social network displays small-world properties is related to two criteria (Watts and Strogatz, 1998): (i) the extent to which, the network displays a high degree of clustering, and; (ii) a characteristic path length. The extent to which nodes are clustered together is measured by the clustering coefficient which reflects the average interconnectedness of nodes within the network. It is
measured by the ratio of the actual number of ties that exist between nodes, to the maximum number of ties that could have existed among them. The path length between two nodes in a network is the smallest number of ties that need to be traversed to connect those nodes. It is measured by calculating the average of all individual path lengths between all connected individual actors (Watts and Strogatz, 1998).

Kogut and Walker (2001) suggest that the network ‘small-worldedness’ be evaluated by calculating a clustering-to-length ratio (termed, a ‘small-world quotient’), which is determined by dividing the clustering coefficient by the path length ratio. Previous research has suggested that a small-world quotient of about 4.75 or higher offers clear evidence of a small-world (Watts and Strogatz, 1998). Thus, the existence of a small-world network indicates that individuals and clusters interact frequently and are closely connected to each other. It may therefore be expected that information diffuses quickly throughout the organization, and that informal control may be stronger relative to a loosely coupled network.

Quantifying social network properties in this way can further sharpen our comprehension of fundamental issues which appear central to the diffusion of informal control, and therefore, how informal control relates to formal MCS. Specifically the adoption of a SNT perspective which reveals the existence of small-world networks can benefit practitioners by providing insights into three important questions:

- **What clusters exist within the organization?**
  Organizations consist of multiple overlapping clusters that may represent different echelons within the organization, including those within and outside the immediate workgroup (Goodwin, Bowler and Whittington, 2009). Given that both formal and informal control efforts involves talking to key people in such clusters (e.g., Mintzberg, 1979), an identification of the clusters existing within the organization, their structure, influence, and composition would seem to be a focal starting point in trying to come to grips with the nature of informal control and the effectiveness of the overall control package within the particular organization. Those clusters that are structurally positioned to exert influence within the network can be pressed to use this influence to assist in ensuring compliance with formal controls, and/or to modify formal controls which, because of their incompatibility with
prevailing organizational culture, may be unlikely to be effective (Richardson, 2009). In this way, adopting a small-worlds approach to analyzing informal control provides managers with an ‘informal organizational chart’ which will assist in assessing how the various formal MCS and informal controls are interacting, and what is occurring within the black box to result in effective and efficient outcomes. It may be that such information may result in decisions about dissipating existing clusters, or encouraging alternative clusters.

• **Which individuals are most and least central in clusters?**

Influence within an organization is not only determined by the formal organizational hierarchy, but also by informal ties of the sort of ‘who interacts with whom during the coffee break’ (Schnettler, 2009), that is, of an individuals’ centrality in the informal organizational hierarchy. Such centrality within a network is likely to have particular implications for (both formal as well as informal) control because of the ability of such centrally located network members to potentially affect the distribution of resources, such as money, information, and legitimacy (Stone and Sandfort, 2009). More importantly from a small-worlds perspective, central individuals are able to bridge otherwise disconnected clusters, and are able to draw on a wide base of ideas to develop and control projects that connect other clusters (Chenhall, 2008). Within a complex network of relationships, for example, the most influential individual may not be one who is directly connected to the target of influence; rather, influence may be exerted indirectly through multiple pathways (Richardson, 2009). The adoption of a small-world perspective reveals the visibility of these linkages within clusters and may serve to clarify those individuals instrumental in influencing control efforts. Identifying those central individuals within clusters will help focus and direct control efforts by involving central individuals within the network in the design, use and monitoring of control efforts, and suggesting who is to be informed about what, where, when, how and why.

• **What types of interconnections exist, and which are most influential?**

As outlined above, interconnections between clusters include formal ties (those based on position or organizational authority), as well as informal ties (those based on social relationships). The kinds of ties relevant for effective control often include hierarchical (vertical as well as horizontal)
relationships, operational responsibility for product/service delivery, and those that in some way confer legitimacy and prestige (Stone and Sandfort, 2009). Moreover, “individuals tend to go to others in organizations that possess the desired expertise for work-related advice, regardless of their position in the formal hierarchy” (Goodwin, et al., 2009). Mapping these interconnections would establish the velocity (speed as well as direction) of influence and transmission of informal control. Such information might be useful for example, to provide an idea of how informal control is exercised, who is instrumental in this process, and how informal control may influence and be influenced by formal MCS key staff and networks at different hierarchical levels. As “anything could theoretically very quickly spread through small-world networks” (Watts, 2004, p. 256), managers need to remain cognizant of the prevailing informal networks and their interconnections within the organization, in order to harness their value or manage any negative impact (Goodwin, et al., 2009). The resources activated in these networks can significantly influence the effectiveness of control efforts (Crawford, 2006). For example, where something gets seeded at one or several locations in a network, and spreads from there indiscriminately into all directions, with the possibility of complete saturation of the network, or where a manager may need to seek a resource and uses chains of intermediaries in a strategy to find a target that possesses the sought resource (Schnettler, 2009).

**Concluding comments**

How formal MCS and informal controls individually and in combination, unite to form an organizations overall control package has become an important development in management control theory. Yet, despite the recognition of the importance of informal control, questions remain about exactly how informal practices exert their influence within the overall control package. Allied to this is the question of the extent to which informal control practices are implicated in the use of formal MCS. Studies to date have identified the influence of informal modes of control both individually, as well as through its interaction with formal MCS however, it is contended that in order to move beyond the metaphorical stage, and to avoid under-specified models of control, a more detailed understanding of how informal modes of control influence formal MCS is required. Once it has been ascertained, ‘what is going on inside the black box of informal control’, then the probability of formal MCS and
informal controls working in tandem are, in turn, likely to be significantly enhanced, resulting in improved control outcomes.

The literature on SNT has demonstrated the important effect that network structures can have on the performance of the network and the outcomes for the individuals that comprise the network. In particular, this paper is arguing the small-worlds phenomenon may provide a useful framework upon which to understand the complexities of informal control, as well as its interaction with formal MCS. Moreover, the techniques and metrics offered by the small-world literature seem worthy of further consideration as one possible means of conceptualising and depicting the means by which informal control is promulgated and enacted throughout an organization, and, by extension, its role in combination with formal MCS in the overall package of control efforts.

**Future Research Directions**

SNT is relatively new to accounting research, yet represents, “great potential as a tool for developing our understanding of accounting in its organisational context” (Chapman (1998, p. 738) Although inroads have been made in applying SNT to management accounting research (Richardson, 2009; Chenhall, 2008), limited attention has been directed to viewing management control from this theoretical frame of reference, and the application of small-world principles to management accounting or management control has been similarly limited. There is need for much further research in this area. In particular, empirical studies which explicitly investigate the prevalence and significance of small-world effects within organizations, the potential for small-world principles to aid in understanding how control as a package may be enhanced, examining how small-world linkages within, as well as between organizations, may influence control, and evaluating the ways in which small-world phenomena may impact on equifinality, are all worthy research directions. These questions are not exhaustive, but rather, represent areas of enquiry which may shed light on how informal control is enacted, and how overall control efforts may be enhanced.
REFERENCES


