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Old wine in new bottles: docility, attention scarcity and knowledge management

Charles J. McMillan

Charles J. McMillan is based at the York University, Toronto, Canada.

Abstract

Purpose – *This paper aims to address the nature of docility in organizations, its practical role in attention scarcity and knowledge diffusion in complex organizations and the management implications for organizational learning and innovation to improve knowledge management.*

Design/methodology/approach – *This paper examines knowledge organizations from the perspective of human resource strategies, their role in information abundance and attention scarcity and techniques to enhance docility mechanisms at different levels of the organization to increase innovation and performance.*

Findings – *This paper, in reviewing the organization literature on attention scarcity, addresses the shortage of studies linking the need for docility – the desire to learn from workers and the desire to teach – in personnel practices of knowledge firms, where intense social interaction, social feedback and social learning are the norms.*

Practical implications – *Knowledge management – scanning, creation, coordination, interpreting, transfer and integration – may well be the basis of competitive advantage, based on human resource strategies to mobilize explicit and tacit knowledge via docility mechanisms, including mentoring, teamwork, coaching and deep collaboration.*

Originality/value – *Decades ago, Herbert A. Simon introduced this new concept, docility, which is now central to knowledge organizations that face information abundance and attention scarcity. Knowledge organizations require tools of docility to align human resource strategies to both strategic management and operational functions to enhance teaching and learning in design structures that are time-constrained.*

Keywords *Docility, Advice giving, Attention scarcity, Deep collaboration, Skills accumulation*

Paper type *Conceptual paper*

> A wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.
>
> — Herbert A. Simon 1971

Introduction

It is a truism in advanced economies that organizations of all types require knowledge workers (Bell, 1973; Drucker, 1993). In this post-industrial information era, depicted as the fourth industrial revolution (Schwab, 2015), the communication's fusion and integration across the physical, digital and biological domains of knowledge, their interactions and speed of innovation impact firms, industries and societies. It is also no accident that the most valuable companies measured by market capitalization (shares issued times share price) are knowledge companies, such as Apple, Facebook, Amazon or Google. Even within industries, there are dramatic variations in overall performance, profitability and innovation, for example, Toyota with four times the profitability compared to General Motors. As organizations and management deal with a world of information abundance, the human challenges of attention scarcity become paramount (McAfee and Brikbrynjolfsson, 2012; Pentland, 2014). Strategies for knowledge creation, search, sharing and coordinating may form the basis of competitive advantage (Spender and

Grant, 1996), but scarcity of attention can lead to a poverty of intellectual engagement for managers and workers.

A central feature of knowledge management is twofold: the creation of new ideas; and the transfer, transmission flow and coordination of knowledge within the organization and the larger ecosystem that encompasses suppliers, customer groups and other key stakeholders. What does knowledge transfer mean for individuals, managers and key subunits that execute knowledge strategies? A lacuna in the knowledge management literature, and the analysis of the knowledge transfer process, is the concept of docility. Docility, from the Latin verb *docere* – "to teach" – combines psychological and cognitive mechanisms to enhance individual knowledge capabilities and is a two-way learning process between an individual and the organizational at large. Simon (1947) first introduced the concept in *Administrative Behavior*, borrowing it from a psychologist, E.C. Tolman. Tolman (1932) defines docility as *teachableness, docileness*; and *willingness to be taught or trained*, denoting a package of personal traits, beyond physical strengths and intelligence. Docility now has a special relevance in the current knowledge firms, a smooth old wine in new bottles, because learning and innovation are pervasive traits in an information-based environment. Indeed, organizations increasingly survive and prosper not on physical capital, embodied in buildings, equipment and embedded technologies, but more on social and intellectual capital, such as forms of social interaction, intense coordination and information sharing as the key to competitive advantage (Boisot, 1998; Nahapiet and Ghoshal, 1998; Bloom *et al.*, 2016).

Knowledge organizations have information, knowhow and knowledge protocols embedded throughout the organizational system and within the larger ecosystem network, so unlocking knowledge sources are central for shared learning and adaptation. Docility becomes a vital tool in individual learning and increasing competitive fitness as a knowledge sharing and advice giving tool. As a general rule, organizations that combine high motivation to learn and high learning mechanisms to absorb knowledge, decision protocols and event cycles will be more productive and innovative in a complex, disruptive environment. Docility facilitates this knowledge transfer. In general, the higher the docility quotient is in an organization, the greater likelihood of high performance outcomes. In practice, docility elevates learning processes, through in-house training programs that cultivate strong social interaction and knowledge sharing, while diminishing knowledge barriers, silos and frictions, to address attention scarcity.

However, not all organizations have "high commitment" work practices, and evidence from big companies shows a knowledge gap on returns on scale and organizational size, as depicted in Figure 1. Indeed, as recent studies show, there may well be a widening gap between leading-edge "frontier" firms and laggard firms on how they use tools for learning and knowledge innovation management (Andrews *et al.*, 2015). Cross-national empirical studies showing performance variations place emphasis on human resource factors, such

Figure 1 Performance impact of technology and knowledge
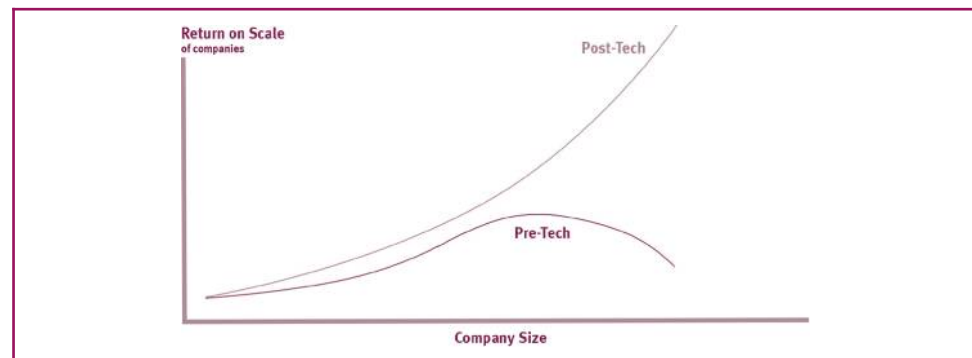
"Docility becomes a vital tool in individual learning and increasing competitive fitness as a knowledge sharing and advice giving tool."

as aligning recruitment, incentives and monitoring behavioral outcomes (Bloom et al., 2016). As Nonaka et al. (2008) have stressed, in their ten case studies of leading Japanese corporations, "It is the responsibility of the leadership to mobilize knowledge that is unevenly distributed, while, at the same time, how to enhance the quality of knowledge on all levels and how to synthesize the diversity of knowledge" (p. 58). Simplistic views of the external environment and rational models of decision-making, based on executive myopias, rarely address life-threatening challenges of potential organizational failure (Halberstam, 1972).

The current knowledge production and consumption advances are fostered by the information revolution and key drivers of computation, data transmission and data storage and retrieval that have increased capacity about 10 million times in two generations (Anderson, 2009), vastly lowering the cost per unit of information access but vastly raising the unit cost (expresses in wages) of human time and attention. Knowledge management requires both conventional and novel suites of human resource strategies to mobilize intellectual capital and social learning tools (Simon, 1991a; Ghoshal and Moran, 1996). However, to achieve "high commitment or high performance set of management practices", Pfeffer (2007) also requires 'investment in training to develop knowledge, a regime of mutual commitment and employment security [. . .] rewards contingent on individual and group and organizational performance; decision-making structures such as decentralization and self-management teams that permit trained and motivated employees to actually influence decisions [. . .] and sharing of information so that people can understand the business [. . .] about what to do and how to do it" (p. 119). As these "high commitment" knowledge organizations mobilize a staggeringly diverse mix of very educated people, knowledge management strategies for internal learning become paramount.

This paper addresses docility as a learning process in a world of information abundance and attention scarcity. There are three objectives. The first is to relate docility to decision-making and learning and expertise development. The second is to set out why corporations need to understand and apply docility mechanisms to deal with attention scarcity and the need for knowledge sharing. The third is to set out design tools to enhance docility and knowledge sharing to address attention scarcity for skill accumulation and organizational learning.

Docility in management theory

A dominant theme in the vast literature on management is the desire to improve organizational productivity and performance (Chandler, 1962; Katz and Kahn, 1966). Writers such as Adam Smith promoted the advantages of the division of labor, and Charles Babbage extended this insight into a hierarchical division of skill levels of physical and mental tasks, themes that evolved into scientific management, human relations and open systems theories. Studies of bureaucratic structure, scientific management and the introduction of management consulting were collective attempts to address the needs of workers and their motivational and work requirements (Carton et al., 2015). Management nostrums such as applying best practices, professional standards and norms of competitive advantage are aimed at reducing wide variation in decision choices, either

because of explicit factors such as economic incentives or implicit factors such as risk aversion, human skills and the psychology of worker satisfaction (McGregor, 1960).

Knowledge and knowledge management were part of the management theory, both in scientific management and new contingency theories of management science (Woodward, 1958; Pugh *et al.*, 1968) but often expressed implicitly. Despite the vast literature in economics, strategic management and organization theory, knowledge management remains an ambiguous, multidimensional category. For example, many economists view knowledge as an asset called human capital (Becker, 1993). Other writers view knowledge as an organizational process or intellectual capital (Nahapiet and Ghoshal, 1998) involving an optimum outcome based on a bundle of explicit knowledge (e.g. knowhow embossed in patents, software, expert systems and corporate libraries) and tacit knowledge, a suite of personal experience, intangible conventions and inductive feedback and heuristics to specific tasks. Despite agreement of the advantages of human resource training, the links to learning outcomes, such as "learning capabilities" (Nonaka and Takeuchi, 1995) or a "learning culture' (Jerez Gomez *et al.*, 2005), vary widely. In this sense, successful adaptive organizations demand leadership and learning capabilities that are institutionalized at all levels, with a focus on enhancing new ideas, intellectual capital and innovation incentives for key stakeholders. Knowledge management, in short, enriches decision-making processes through social interactions that recognize, know, retrieve, coordinate and transfer information and intelligence to address role expectations, organizational uncertainties and environmental (Nonaka and Konno, 1998).

To adopt Tichy's (2008) term, they become teachable organizations. Training and expertise improve personal and organizational decision-making through concepts of "best practices". Training programs – internships, formal courses, apprenticeships, on-the-job training, self-learning programs, six sigma or quality circles – build organizational capabilities and mitigate risks from operating with incomplete knowledge, inexperience and understanding operating rules and procedures, especially in chaotic and uncertain environments and untimely turnover. These teaching organizations operate with a high docility quotient at all levels. In many ways, such knowledge organizations echo the words of Molière, "what do you know about that! These forty years now I've been speaking in prose without knowing it".

Docility[1], introduced to the organizational theory by Simon (1947), denotes a package of personal traits, beyond physical strengths and intelligence, citing E.C. Tolman, who defined docility as *teachableness, docileness* and *willingness to be taught or trained.* Simon (1947) explains the concept of docility:

> Docility is characterized, then, by a stage of exploration and inquiry followed by a stage of adaptation. It can be observed in the behavior of individuals and in the behavior of organizations. A man learning to operate an overhead crane first obtains information from someone skilled in its operation as to how it is controlled and what the functions are of the various instruments and levers. He then supplements his information by experimenting with the crane, gradually learning from practice what reaction he can expect from the equipment when it manipulates it in a particular way. When he has reached this point, he is able to use the crane to accomplish his purpose – to adapt the manipulation to his ends.

"In practice, docility elevates learning processes, through in-house training programs that cultivate strong social interaction and knowledge sharing, while diminishing knowledge barriers, silos and frictions, to address attention scarcity."

"**Knowledge organizations must go well beyond balancing the technical needs of physical assets and machinery with conventional workforce systems like recruiting employees with superior formal education.**"

Although knowledge management is influenced by human resource policies, organizational design and incentives to cultivate learning, even in advanced countries, employees are still seen as extensions or adjuncts of machines so that work and supervision practices become path dependent, i.e. based on past practices with great persistence (Aguinis and Kraiger, 2009). Despite knowledge diffusion requirements, widespread practices focus on problems of role conformity, rule compliance, organizational routines and manager–subordinate linkages that allow recurrent replication and imitation outcomes via specialized tasks to organizational regularities (Cohen, 1981), industry recipes (Spender, 1989) and conformance to standard operation procedures (Cyert and March, 1963). Human resource policies often deal with worker fatigue (hours worked and shifts), time and motion practices, training[2] and pay and incentives based on hours worked and output measures. The classic idea of bureaucratic organization set out by Max Weber, and the paradigm of centralized hierarchical structure of standard rules and limited participation and motivation based mainly on economic incentives, has been vastly reformulated (Pugh *et al.*, 1968; Perrow, 1970). However, in the public mind, the global stereotype of such practices is a military organization, a government bureaucracy or a mass assembly line in a car factory. However, as Zander and Kogut (1999) argue, "the claim that firms act as social communities for the creation and communication of knowledge requires a more explicit description of the motivation and cooperative choices of the individual members" (p. 85).

By contrast, in knowledge firms, technological advances such as the internet and smart phones accelerate the attention demands to address external uncertainties and the rhythms of speed, time compression and immediate feedback. Counter organizational examples of bureaucratic stereotypes – hospital trauma centers, corporate research labs, artistic organizations such as symphony orchestras or theater companies, winning sports clubs, volunteer organizations, etc. – illustrate a very different knowledge paradigm. In organizations where knowledge management is central, when economic incentives are less relevant, knowledge is diffuse and shared, and decision-making is a collective process. Despite distinctive individual expertise and skill sets, there is a need for knowledge coordination and dissemination to cope with event cycles, new technologies and time-constrained problem solving. Clearly, such examples illustrate the demands for collective knowhow integration and cooperation to attain high performance output.

Simon (1947) draws on Tolman's (1932) classic study, *Purposive Behavior in Animals and Men*, and his views on learning processes such as purpose (goals), thought processes (cognitive psychology) and cognitive maps. Simon (1947) adopts these terms and sees docility mechanisms "[. . .] to observe regularities in nature of a very general sort, and to communicate with other human beings, helps him to shorten materially the learning process" (p. 86), i.e. the process how individuals learn from social channels for information and advice for decision choices. Decades later, he adds that "the docile are not passive: they are simply receptive to social influence, and what constitutes appropriate social influence for them is itself defined by their social environment" (Simon, 1993, p. 95). Docility is an active organizational process that leads to enhanced knowledge capabilities through a two-way, mutually shared interaction that expedites knowledge search options. Docility is a conscious transformation, a willingness to learn and a capacity to teach. Knowledge

search options are a form of deliberation and are costly in time and money, involving both the knowledge that is transmitted and the time procedures that impacts memory, knowledge recall and behavior from past experience.

## Docility and teachability in organizations

Goal structures, problem solving and the mechanisms to address multiple issues (exogenous and endogenous) impact attention scarcity in organizations (March and Simon, 1958). Organizations, in short, may reflect rational intent (Thompson, 1967), but design choices also reflect human resource policies that may or may not cultivate learning competences to reflect strategic problem-solving. Docility is a central tool in design choices.

Organizational knowledge, construed as a repertoire of present and future program routines, allows individuals through docility mechanisms to combine personal attributes, including emotions, tacit conventions and competences, with organizational identification and purpose. Decision processes such as search; preference ordering of alternatives; and beliefs and expectations of solution consequences form a deliberative investment, costly in time and cognitive effort. Individuals are purposive agents with varying diagnostic skills to apply memory, intuition, judgment and advice to search, weigh, question, reject or select categories of choice. The accumulation of experience from past routines, recurrent activities and social interaction and environmental cues generate docility improvements and deliberation payoffs. Positive feedback loops, as March and Simon (1958) emphasize, are important, but so too are extensive social interactions that form cognitive patterns that, with practice and experience, aid memory and speedy recall (Simon, 1983a; 1983b; Nonaka and Takeuchi, 1985).

What are the variables that define docility in an organizational setting? Within the organization, docility takes place in what Katz and Kahn (1966) call the "role set", where role behavior is "the process of learning the expectations of others, accepting them, and fulfilling them" (p. 173). Organizational identity offers a sense of a "shared central character" and a process for learning shared values, expectations and conventions (Albert and Whetton, 1985) or what Simon (1947) refers to as the identification process, "i.e. the value and factual premises upon which he bases his decisions". Docility forms a two-way, reciprocal social activity that elevates and enhances shared knowledge, memory and social protocols.

As depicted in Figure 2, the individual agent's docility processes, his motivation to learn and his core knowledge and skills are subject to teaching mechanisms of the organization itself and the cognitive maps of the role-set that make sense of problems and attention

Figure 2 Elements of a docility model


Source: McMillan (2016)
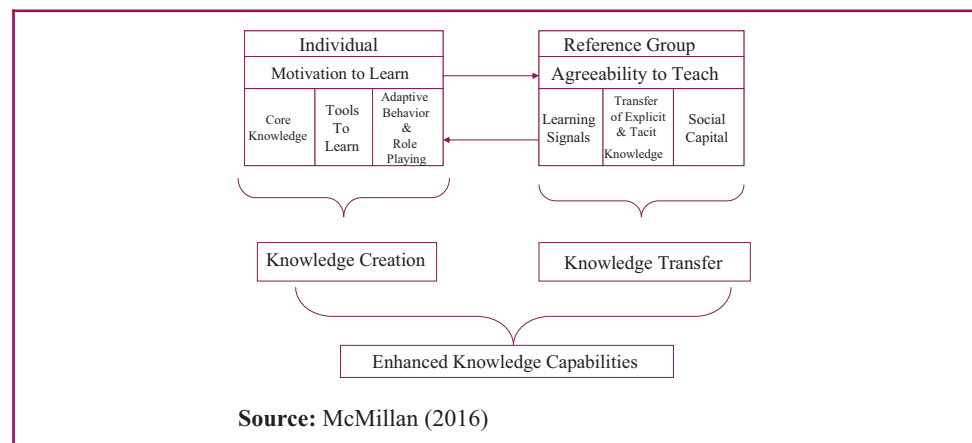
preferences. The general process of organizational identification, i.e. the alignment of individuals, groups and the organization toward goal attainment and purposive behavior, is a function of task requirements, shared experience and solution-setting activities. Docility mechanisms are premised on how environmental events at one stage influence environmental events at future stages. Docility is an active process, made more so by the actions of individuals who are motivated to learn, and organizational process that reconfigures roles and role requirements to address attention ambiguities. Individual attributes include natural, inherited abilities that strengthen docility mechanisms as a deliberative if imperfect choice calculation is used to attain achievable goals (outputs). Two-way communication flows are based on information cues; tacit decorum and conventions; skills competences and knowledge patterns; task environment cues; and organizational memory. Docility, in short, becomes the core link between individual learning and organizational purpose. In a world of information abundance, high organizational docility provides an economy of attention focus. Alone and in combination, docility contributes to the creation and development of intellectual capital[3].

March and Simon (1958) address this two-way voluntary activity: "humans evaluate their own positions in relation to the value of others and come to accept others' goals as their own. In addition, individual members of an organization come to it with a prior structure of preferences – a personality, if you like – on the basis of which they make decisions while in the organization. Thus individual goals are not 'given' for the organization, but can be varied both through recruitment procedures and through organizational practices" (p. 65). Katz and Kahn (1966) call these processes role readiness, "the essence of the social relationship [. . .] is the give-and-take character of the task environment of the social setting in which people are mutually dependent upon one another" (p. 57).

As many academic and managerial writers have stressed, identification is a compelling integration mechanism linking organizational goals with individual and group goals (Albert and Whetton, 1985; Senge, 2012). Lave and Wenger (1991), stressing on learning from "communities of practice", make the following point: "We conceive of identities as long-term, living relations between personas and their place and participation in communities of practice. Thus identity, knowing, and social membership entail one another". (p. 53). Certain cognitive mechanisms such as attention-directing and computational complexity combine with personal attributes such as motivation (incentives), status (compliance) and individual skills (belief structures) that impact decision-making and potential conflicts (Simon, 1947). Further, docile actions involve "a two-way feedback and interaction help establish habits, routines, and best practices via combinations of intuition, deliberation and judgment. This reciprocal feature of docility provides a complementary mental map anchored in shared understanding of habits and social practices that are transformed in time. Docility, in short, improves and may expedite decision heuristics, including written, verbal, or trial-and-error protocols" (Ericson and Simon, 1993). A more complete model of docility and procedural learning is set out in Figure 3.

Many studies outline polar opposite organization archetypes that address three levels – the individual, the organization and the external environment. Well-known examples that describe and highlight differing hierarchical structures and incentive schemes include McGregor's (1960) Theory X or Y or Burn's and Stalker's (1961) mechanistic or organic structures and reaffirm behavioral assumptions to align the needs of the individual with the high performance needs of the organization. Role requirements and social relationships impact communications patterns, norms of personal trust and rule compliance and show how shared learning strengthens organizational knowledge. Roles and role structures, in short, embody the organizational routines and protocols to process and coordinate the signals and social cues from the external environment and the design tools to adapt or maladapt. This perspective echoes the observations of Penrose (1959), who suggested experience "develops an increasing knowledge of the possibilities for action, and the ways

Figure 3 A framework for organizational docility

Source: McMillan (2016)
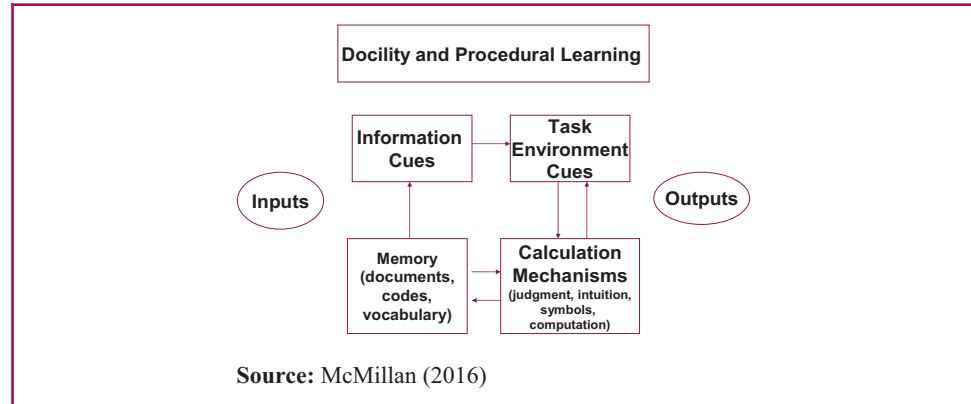
in which action can be taken by [. . .] the firm. This increase in knowledge [. . .] contributes to the 'uniqueness' of the opportunity of each individual firm" (p. 53).

Increasingly, organizational training is central to attention scarcity, as Simon (1947) put it, "training prepares the organizational members to reach satisfactory decisions himself, without the need for the constant exercise of authority or advice. In this sense, training procedures are alternatives to the exercise of authority or advice as means of control over the subordinate's decision". Indeed, this perspective parallels McGregor's (1960) Theory Y, which is "a process primarily of creating opportunities, releasing potential, removing obstacles, encouraging growth, and providing guidance". In knowledge organizations, problem solving and decision allocation are central organizational design challenges when viewing organizations as a systems of event cycles or what Katz and Kahn (1966) define as "an interrelated set of events which return upon themselves to complete and renew a cycle of activities" that require social interaction, subunit dependencies and activity sequencing.

Docility and organizational design

Does organizational learning take place only at the level of the individual in an organization, or do organizations cultivate collective learning capabilities, beyond the sum of individual learning? Simon's (1991a, 1991b) perspective is unambiguous: "we must be careful about reifying the organization and talking about it as 'knowing' something or 'learning' something [. . .] all learning takes place inside individual human heads [. . .] internal learning is very much a social, not a solitary, phenomenon" (p. 126). However, other authors (Hedberg, 1981) take a contrasting view, arguing from both theoretical and empirical work that organizations create learning capabilities and are dynamic in nature, allowing a cascade of improvement and continuous learning. As Hedberg (1981) notes, "[. . .] members come and go, and leadership changes, but organizations' memories preserve certain behaviors, mental maps, norms and values over time" (p. 6). In the current information world, some organizations have structured their activities to incorporate internal processes, decision attention and learning capabilities beyond individual or executive expertise. Organizational learning now incorporates individual learning, collective (team) learning and social learning (organizational culture) that embody dynamic learning capabilities (March, 2008; Teece, 2014).

In knowledge organizations, embedded knowledge has unique features, viewed not as a "stock" or "asset" such as land, buildings or equipment (often depicted as hardware) in the approach of economists or accountants. By contrast, knowledge is not viewed as a metaphorical lake or a body of water but as a fast moving river, where knowledge flows with constant improvements based on easy access to data, feedback tools of continuous improvement and cumulative capabilities based on social interaction (Lam, 2000). The contrasts between strategies for organizational exploitation – i.e. adaptive processes that refine and perfect existing knowledge competencies, technologies and decision

allocation – and strategies for organizational exploration – i.e. novel processes that prospect for breakthrough ideas, reconfigurations and innovative outcomes – demand contrasting decision processes and skill accumulations (March, 2008). Exploitation strategies tend to have hierarchical design architecture and a premium on economic incentives, where authority and knowledge are centralized, and workforce practices allow well-refined analytic processes (e.g. replication and imitation) to adapt to stable technologies and benign environmental forces. By contrast, exploration strategies demand a knowledge paradigm of risk-taking, novel identities, extended time horizons and intense social interactions but costly and potentially wasteful investments in creative replacement, recombination and potential destruction (Simon, 2001).

The bounded rationality framework, rooted in the limits of human intelligence, incremental goal search and solution calculation, involves psychological and cognitive mechanisms that human agents actually perform (March and Simon, 1958; Cyert and March, 1963). Simon (1987) makes the following telling comment: "The most reliable base of management influence is the power to set the agenda, to focus attention. It is one of the most effective tools the manager has for training organizational members to approach problems constructively by shaping their own habits of attention" (p. 63). Docility mechanisms are procedural in the learning process, so design issues influence cognitive efforts and emotional adjustment. Design architecture affirms decision attention where computational requirements vary for complexity, uncertainty and vague problem definition. Design also channels social cues and information flows, and organizational memory can enhance or diminish learning and the riskiness of choices. Past successes and failures of choices in organizational life impact behavioral demands and reactions, including use of intuition, guesswork, emotional contagion and bandwagon impacts and perhaps even unconscious factors such as serendipity, ritual, confusion and ambiguity, internal contradictions, chaos and vicarious learning (Rogers and Shoemaker, 1971; Takeuchi et al., 2008; Weick, 2016).

This aspect of docility, the intellectual and social environment of advice-giving and sources of communication flows, is itself a design choice (Martin, 2009). To nurture organizational adaptation and aspirations of superior performance, docility mechanisms (advice giving, mentoring, coaching and use of experts) accelerate an agent's learning (acquiring knowledge) and fast search processes that raise expectation levels and mitigate or eliminate bad habits, faulty routines and path-dependent action. Pioneering work practices at Toyota[4], for instance, stress skill accumulation through constant training, high social interaction and attention to processes that provide feedback and shared mental models. Social influence and advice-giving address attention focus. This suggests a hypothesis:

> *H1.* High docility organizations will cultivate communications mechanisms for expertise, knowledge exchange, judgment and tacit knowledge via team-work.

Low-docility organizations face a cost tradeoff between deliberation effort versus calculation effort. In certain situations, the outcome may result in myopic behavior from false cues, gossip, rumor and even deception (Kayes, 2006; Fleming and Zyglidopoulos, 2008).

These organizational design calibrations affect decision-making processes, attention spans and evolving role expectations. Certain design features seek out advice-giving and knowledge enhancement, for example, *boundary spanners*; scanning, understanding and interpreting knowledge, for example, *technology gatekeepers*; and purchasing or selling knowledge and intellectual property, for example, *technology brokers* (Hargadon, 2003). Clearly, in a digital, internet world, organizations can store and retrieve knowledge through repositories such as libraries, databases, expert systems and software (Pentland, 2014). Explicit knowledge is characterized by the feature that was once created; the use by one person does not preclude its use by others. Major advances in simulating tacit knowledge via decision support systems, artificial intelligence and novel tools of algorithms of big data expedite search options while reducing unit costs (McAfee and Brikbrynjolfsson, 2012). These knowledge depositories, combined with advances in cognitive sciences and cybernetics, allow decision makers to apply explicit and tacit knowledge and special

natural abilities of participants (e.g. hand-eye coordination found in athletes, musicians and surgeons) to form and improve pattern recognition that comes from practice and experience. As Simon (1983b, p. 4570) emphasizes, "knowledge and persistence do seem, indeed, to be pre-requisites to high-level performance".

However, organizations vary widely by resource endowments and access to slack (the gap between existing resources and activated demand), so design features that allocate scarce resources, including time, information flows, learning capabilities and decision attention, impact human resource practices and the attention allocation of participants to strategic issues (Davenport and Beck, 2001). As a result, the salience of certain issues and the levels of knowledge absorption influence decision choices (March and Simon, 1958). Organizational slack may provide opportunities for novel search programs by utilizing excess resources to increase performance (Marlin and Geiger, 2015). However, limited resources and time constraints, as in crisis situations, can also produce novel solutions by docility mechanisms of shared mental models and advice sharing as untried and risky choice options through intense attention search, social interaction and creative bundling of existing resources. Such practices as scrounging and tinkering are examples, based on activities that "cobbling together slapdash solutions to adaptive problems as they arise, using whatever materials happen to be at hand, and with no foresight, planning, or attention to goals" (Turner, 2007). Docility promotes use of available resources, often in chance-seeking environments (Bardone, 2013).

Organizations with a high ratio of docile employees, as a general rule, have higher skills capacity to process information and make superior decision choices. Why? As outlined in Figure 4, in an environment of abundant information, docility mechanisms improve capacities to seek out, process and assess information and knowledge flows. Docility mechanisms enrich the decision process to address attention scarcity, including capacities to appreciate weak signals of scarcity, and to design attention systems to address problem solving both with deadlines and flexible time lines.

Design arrangements impact roles, information flows and decision processes that increase or diminish attention-seeking scarcity. Design systems that increase knowledge symmetries[5] include access to knowledge specialists, incentives to eliminate distractions and high levels of knowledge absorption as an alternative to executive authority. However, in situations of knowledge asymmetries that apply restrictions on knowledge sharing (via information exchange, social interaction and access to knowledge depositories), bureaucratic characteristics such as role status, rules compliance, rituals and symbols may produce what Crozier (1964) calls a vicious circle, i.e. limited attention focus amplifies information filters and restricts attention-directing stimuli.

Docility mechanisms encompass knowledge sharing, memory and information cues but depending on events, may be time-constrained. As Darroch (2005) puts it, "the more

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**Figure 4** Docility mechanisms and attention scarcity
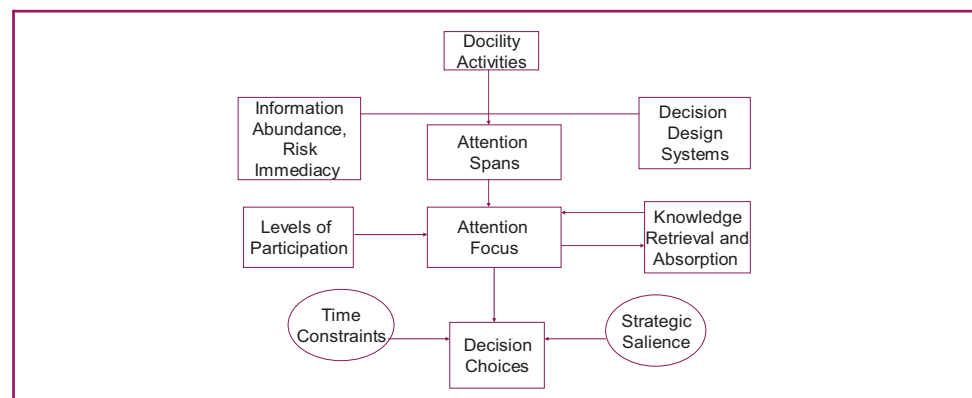
knowledge, and the greater the variety of knowledge, the better" (p. 105). This repository of information, advice-giving and explicit and tacit knowledge calibrates attention directing and attention spans through formal roles and communications channels and distribution of competencies. Establishing design systems of mutual reinforcing learning nourishes an environment of continuous innovation and enhanced performance. Docility learning influences parallels Churchman's (1971) "design of a system of inquiry" and what Simon (1987) calls the "process of intelligence, design and choice".

Innovations in products and process stem not only from ideas and suggestions from external sources, for example, suppliers and customers, but also from creative internal advice-giving, systems thinking and personal interactions[6], or what Nahapiet and Ghoshal (1998) call intellectual and social capital. Learning competences demand a portfolio of social interaction and design arrangements for goal setting, communication flows and sense-making. Training, high skill sets and organizational practices are important, but so too are the attention focus choices for goal setting, information exchange and a culture of sharing. When knowledge symmetries are low, as in more hierarchical authority systems, docility mechanisms increase knowledge sharing, where tools such as mentoring and team work reduce the gap through social interaction and information exchange. By contrast, in situations of extended time frames and high knowledge symmetries, design choices for coaching and deep collaboration become optimal. In the real world, knowledge organizations enrich docility mechanisms by applying one or more design choices, and some use all four, based on the demographics of the workforce, the strategic issues they face and the speed and pace of innovation. These four decision design choices enrich advice-giving, sharing tacit knowledge and experience and knowledge transfer only in degree and are shown in Figure 5. Each model is elaborated.

Mentoring

Mentoring is an asymmetric relation between an individual (protégé) and a person with status, experience and knowledge who serves as counselor, role model, teacher or guide (Kram, 1985; Scandura and Pellegrini, 2007). Mentoring encompasses knowledge transfer, based on rules, codes, working documents and procedures, but may allow a measure of knowledge expansion via procedures and sequential process imparting instincts, intuition or even imagination. A mentor relationship may be a short time period, involving a close, two-way bond based on attribution and identification between the parties. The asymmetric feature of mentoring occurs when the mentor initiates interaction and advice-giving to a protégé for favorable attitudinal and behavioral outcomes, such as motivation, positive interpersonal relationships and career paths. The acceptance of knowledge asymmetry derives from an affinity of trust, respect, experience and the capacity to impart tacit knowledge menus, recipes and rules of thumb, i.e. heuristics. The study of mentoring and mentoring relationships is often linked with youth development and their career paths and is associated with organizations such as Big Brothers, the academic world and the workplace (Underhill, 2006; Eby et al., 2003). Individual skills and experience impact the mentor relationship and the capacity to enhance the broader knowledge domain beyond immediate tasks requirements, including error detection, course correction and a sounding

Figure 5 Docility mechanisms in organizational settings
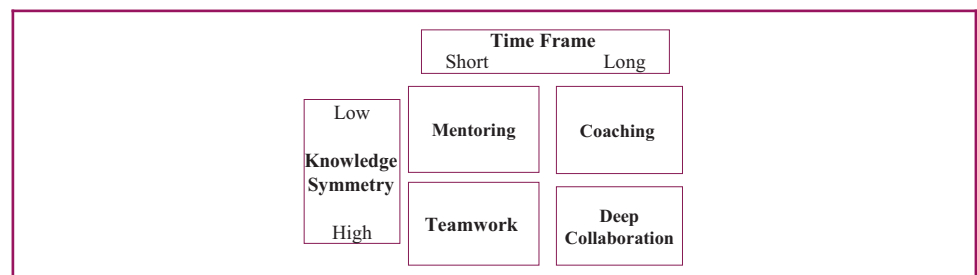
board for sense-making skills to encourage smarter, faster and more decisive learning. Empirical evidence on mentoring suggests that the outcomes for the protégé have greater impact on attitudes than actual behavior or performance (Eby, 2008).

Teams

Teams pool diverse individual expertise and knowledge around cohesive structures, feedback and concrete goal setting (Bradley *et al.*, 2013). Teams differ from groups, which are a collection or aggregation of diverse individuals. Katzenbach and Smith (1993) suggest that groups demonstrate that the sum of the whole is less than the potential of the individual parts. Crozier (1964) notes the temporary features of groups: "[. . .] they may disappear or change substantially in the near future; still more frequently, for a number of individuals, membership in a group is likely to be temporary". Group problem solving fails to address the complicated sub-unit interdependencies, measures of self-sufficiency and closed-systems thinking and naïve reliance on past routines. Teams not only share information and norms of learning but also encourage constant feedback as both praise and criticism (Fishbach *et al.*, 2010).

In their review of total quality management (TQM) practices, Prajogo and Sohal (2001) suggest that "cross-functional team-work is one of the most effective channels of communication, and communication is recognized as the primary determinant of organizational innovation" (p. 546). Hackman (2002) emphasizes on the team composition: "it is consequential, which engages the talents of members and encourages the team to identify and use well the full complement of members 'knowledge and skill'" (p. 72). Morgeson *et al.* (2010) address the leadership processes with teams: "informal internal leadership is likely to provide ongoing peer coaching as the team performs its tasks, informal external leadership is likely to offer a broader type of mentoring relationship, and formal external leadership is likely to be oriented around formal training and development experiences" (p. 17). The outcome is clear: knowledge learning, shared mental models and knowledge applications demand intense commitment to team members' personal growth, collective skills accumulation and successful performance. In contrast to groups that may display high individual competitive behavior for resources and attention, a zero sum approach, teams have a cooperative, deliberative design where skills, talents and natural abilities are pooled, thus removing barriers and silos, and collective incentives encourage high interaction and learning by participation.

Coaching

Coaching, a widely practiced process in the athletic world, is increasingly recognized as a management design to encourage learning for individuals and teams (Hackman and Wagerman, 2005; Tichy, 2008; Cotu and Kauffman, 2009). Historically, biographical studies of leaders illustrate the influence of *eminent grise* as a source of knowledge, opinions and judgment, and certain organizations cultivate these sources, such as in political parties (the elder statesmen) or universities (emeritus professors). Coaching is a two-way knowledge transfer system, similar to consulting, that develops the capabilities of high-potential performers, based on a "fierce desire to learn and grow" (Cotu and Kauffman, 2009). Coaching combines the Socratic method of probing, disciplined thought and self-assessment around high performance standards. Coaches provide strategic feedback in the context of attributes of emotion and mood, both positive and negative. The coaching role offers a scarce resource and individual attention to goal achievement by improving and improvising natural inequalities. William Osler, a Canadian academic physician who pioneered the clinical clerkship in medical education, i.e. students dealing with patients on hospital wards, describes the coaching process as follows: "The student starts, in fact, as a *practitioner*, as an observer of disordered machines, with the structure and orderly functions of which he is perfectly familiar. Teach him to observe, give him plenty of facts to observe, and the lessons will come out of the facts themselves. For the junior student in medicine and surgery it is a safe rule to have no teaching without a patient for a text, and the best teaching is that taught by the patient himself" (Bliss, 1999).

Deep collaboration

Deep collaboration, the most extensive docility mechanism, is a design model for goal setting, communicating and sense-making across organizational boundaries to leverage knowledge to meet time-based competitive forces (McMillan and Stalk, 2015). It combines formal and informal role requirements that intensify shared norms of learning and discovery, cumulative skills and capabilities and robust and judicious combinations of sharing ideas, best practices, tangible and intangible knowledge for target-setting, real-time feedback and potential changes in organizational processes (Brown *et al.*, 2015) Deep collaboration is time-consuming, costly in data analysis and necessitates novel methods to design, evaluate and verify data gathering and data feedback. It also allows organizations to design teams of teams, where multidisciplinary thinking and social cohesion orchestrate the tools of intensive coordination, target setting and regular feedback (Takeuchi *et al.*, 2008).

As a design model, deep collaboration realigns ambiguous external signals, informal yardsticks and past performance benchmarks and makes them explicit and shared across the organizational system, horizontally and vertically. In practical, high-performance organizations require the alignment of team performance and robust coordination based on intense communication flows (Barrick *et al.*, 2007). Examining knowledge diffusion, March (2008) suggests a mutual learning multiplier: a strong positive feedback loop by which jointly favorable experiences lead to further jointly favorable experiences, and jointly unfavorable experiences lead to further jointly unfavorable experience. In time-based tasks – surgical teams in a trauma hospital, fighter pilots in combat and policemen facing a murderous suicide threat – deep collaboration allows explicit knowledge to become intuitive, tacit understanding of various options and a finger-tip feel for mental maps. Few organizations manage the inherent contradictions and tradeoffs, such as internal routines and conflicting views, lower costs but higher quality via inspection and steady pace with big leaps (Takeuchi *et al.*, 2008; Sullivan, 2010). The aim is to assure sustained improvements and optimizing strategies for the total organization and not optimize outcomes for certain members or sub-units only.

In summary, these four design models for goal-setting, knowledge sharing and attention focus reflect individual skills and docility and the patterns of shared decision-making. In cases of asymmetric knowledge, mentoring and teamwork diminish the knowledge gap by strengthening individual tacit norms and skills through social interaction, advice-giving and weighing of evidence. Cycles of social interaction, knowledge sharing and systematic feedback strengthen docility mechanisms. However, both individual and organizational barriers to sharing knowledge (Riege, 2005) can reinforce a hierarchical culture that inhibits cooperation, individual initiative and collective learning. In knowledge organizations with high symmetries of knowledge and skills, illustrated by a repertoire of an educated, experienced workforce with intense desire to learn, design mechanisms such as team work and deep collaboration foster an embedded culture of cooperation, knowledge sharing and attention focus among highly specialized individuals. In each case, docility provides an economy of adaptive search behavior, distraction avoidance and shared attention focus on specific goals and problems. Instructional features of learning and teaching through coaching and deep collaboration increase intellectual and social capital. Knowledge organizations cultivate docility mechanisms to activate learning skills by enhancing individual capacities to access and process tacit and explicit knowledge protocols. Human resource strategies that invest in shared forms of pattern recognition, experience and mental models through coordinated actions (Mathiew *et al.*, 2000) will have high performance outcomes.

Conclusions

Docility, an ancient concept dating back to classical philosophers such as Aristotle and Socrates is akin to an old wine updated and presented in a new bottle and has profound importance currently in knowledge organizations. Knowledge organizations incorporate human resource policies that promote a willingness to leverage knowledge expertise at all levels by recruiting and cultivating employees with high levels of willingness to learn and

promoting a culture with a willingness to teach. Learning skills require hands on, activist processes to assure sustained high performance, based on intense social interaction and feedback at all levels. Docility as a willingness to learn and docility mechanisms contrast with conventional corporate behavior with centralized decision-making and priority on general skills, displaying what Crozier (1964) calls the blind spot: "Those who have the necessary information do not have the power to decide, and whose who have the power to decide cannot get the necessary information" (p. 51).

This research paper addresses the concept of docility as a central mechanism to address attention scarcity in knowledge organizations. In the current knowledge world, with an abundance of information but with attention scarcity, knowledge management needs to go well beyond conventional human resource policies that are subordinate to strategic goals and operational tools in knowledge management, such as experience curves, psychological contracts and models of risk management (Massingham and Massingham, 2014). Further, knowledge organizations must go well beyond balancing the technical needs of physical assets and machinery with conventional workforce systems like recruiting employees with superior formal education. The second challenge of information abundance requires novel design approaches to address attention scarcity by leverage divergent thinking and collective performance based on feedback processes and intense social interaction. Organizations vary in their sources of knowledge, where it resides and where it is dispersed. Unlike traditional hierarchies, knowledge organizations design tools to promote knowledge symmetries by promoting high investments in social and intellectual capital that allows not a discount rate but an accumulating premium of embedded knowledge and firm-specific intellectual capital.

The third challenge in knowledge management is to set out design tools to enhance docility and knowledge sharing to address attention scarcity for skills accumulation and organizational learning. This paper addresses four models, namely, mentoring, teamwork, coaching and deep collaboration. Docility is central to strategic decision-making, because an abundance of knowledge and information requires coordination and high social interaction of specialized advice to increase attention focus. Emphasis on high docility at all levels removes organizational barriers to knowledge sharing and weakens information distractions, competency traps and nostrums such as "not invented here" and climate norms of a "yes man" mentality. History can be an effective teacher, as shown in the wisdom of Tennyson's Light Brigade, "Their's but to do and die" or Churchill's lament after the fall of Singapore: "I ought to have known. My advisors ought to have known and I ought to have been told, and I ought to have asked". It is better first to reason why.

What is missing in knowledge management is the decision processes that combine elements of speed of deliberation, intensity of knowledge calculation and leveraging collective experience with divergent thinking. Docility is an adaptive process for willing partners, because it allows collective learning without resorting to myopic dysfunctions such as blame, deception or attention distraction. Docility mechanisms augment knowledge creation and idea diffusion, despite differences in skills, experience and personal habits. Knowledge transmission and transfer are individual process, aided to be sure by documents, software and work-sharing practices, but they are fundamentally based on social interaction of individuals (worker-manager, production engineer-personnel manager, scholar-CEO and VP Finance-consultant), not a reification of the organization with sub-units, the larger eco-system or strategic alliances among firms. Docility provides a framework to reassess issues such as knowledge sharing and understanding of communication channels that focus on attention scarcity and allows attention focus on external cues, weak signals and rigorous dissemination throughout the organization.

Docility applications in organizations can vary widely, depending not only on external forces, competitive rivalry and stakeholder goals but also on management practices that leverage individual knowledge and foster a learning culture. Concepts such as dynamic capabilities are actually based on human capabilities, employee skills and experiences

and their social interactions vertically and horizontally that promote curiosity and discovery. Knowledge organizations make choices in their design arrangements, depending on time horizons and knowledge symmetries, using models such as mentoring, teamwork, coaching and deep collaboration. Docility strengthens robust social interaction and advice-giving that enhances collective learning and provides attention focus to assert relentless improvement and innovative thinking. In an ideal world, knowledge organizations include multiple models and experimentation with new forms and combinations. Students of knowledge management, including practitioners, need to study leading knowledge organizations as prototypes, possibly using comparisons in the same sector, such as research labs in universities, new product models in the auto sector or decision models in software firms to benchmark learning mechanisms over time.

Organizations also vary widely in their internal collaborative culture, but as Simon (1947) has emphasized, "though all participants are agreed on the objectives to be attained, they cannot ordinarily be left to themselves in selecting the strategies [. . .] for the selection of a correct strategy involves a knowledge of each as to the strategies selected by the others" (p. 73). Docility represents the action component of learning and accepting advice. Docility, in short, reinforces the lessons of Louis Pasteur, "chance favors the prepared mind".

Notes

1. Docility in the English language illustrates the ambiguities and contradictions of the language of Shakespeare. In its dictionary meaning, and its etymology from Latin, docility (from *docere* – to teach) has a very different meaning to the colloquial or vulgar use of the adjective "docile", implying intractable, passive, unmanageable or incorrigible. In Latin, a language of precision, there are a variety of related words, phrases and meanings connected to *docility,* such as *docilitas* (teachableness)*, doctor* (teacher) and the verb (first person indicative), *disco, I know,* i.e. the present perfect of an irregular verb, *discere,* meaning *I have learned,* i.e. I know. For the historical background of Simon's work on docility and his intellectual debt to E.C. Tolman, and his extension to altruistic behavior, see McMillan (2016). For background on Simon as a social scientist and Nobel Laureate, see Augier and March (2004) and Spender (2013).

2. Frederick Taylor, addressing the issue of executing scientific management before a Congressional committee, indicated his preference for a system of one-to-one conversation to train workers. "It is only when we fully realize that our duty, as well as our opportunity, lies in systematically cooperating to train and to make this competent man, instead of hunting for a man whom someone else has trained, that we shall be on the road to national efficiency". (Taylor, 1947), p. 6.

3. Advice-seeking and advice-giving behavior have long been recognized in selected social networks such as the College of Cardinals in the Catholic Church and the invisible college in the academic world (Crane, 1972). Such social networks facilitate a process of knowledge diffusion through informal communications channels, where "centrally located leaders play important roles in communicating knowledge and diffusing innovations" (Hagstrom, 1973). In the post-industrial internet world, SNS, the "social network service" is the most comprehensive, integrated online interpersonal platform, including social networks to make friends and display personal information and to display synchronous and asynchronous communications. Facebook, founded in 2004, has over a billion accounts and is the largest SNS in the world (Mazman and Usluel, 2011). Starting with the PC and extending to smart phones, technology provides word processors, spreadsheets and many applications leading to internet-enabled search engines – e-commerce, e-mail and messaging, social networking and SaaS business applications. Smart phones have now enabled mobile messaging, mobile social networking and on-demand services such as Uber.

4. In contrast to academic and media coverage of de-skilling, automation and machine learning in the USA, Japanese firms have pioneered efforts to instill and augment the knowledge component in jobs. Strategies to remove the three Ks (*kitsui*, tiring; *kitanai*, dirty; and *kiken*, dangerous) are widespread in both industrial and service sectors by recombining knowledge in organizational sub-units and job design through automated systems, robots and computer-based expert systems (McMillan, 1987). Skills accumulation for manufacturing jobs pioneered in Japan but is now widely practiced and replicated in Japanese factories abroad, illustrating docility mechanisms. According to Fugimoto (1999): "Shop floor workers are expected to do multiple tasks across workstations, as well as between

direct and indirect work, to sustain the flexible production system and to reduce 'muda' – non-value adding time - in their work time. On-the-job-training (OJT) through rotation and direct instruction from veteran workers and leaders are common modes of skill accumulation. In this sense, certain mechanisms of skill transfer that resemble the apprenticeship of old craft-type systems, such as direct job instructions from veteran supervisors, remain in the mass production shops" (p. 295).

5. In the design system Winston Churchill instituted in Summer 1940 after he became the Prime Minister on May 10, attention scarcity was amply described. Given his experience running two ministries during the First World War and working with two Prime Ministers (Asquith and Lloyd George) with widely different capabilities and personalities, Churchill was the architect of the government's war-making instrument of policy and execution. In addition to his onerous roles as the Prime Minister, Churchill appointed himself as the Minister of Defense, thus presiding over the military Chiefs of Staff Committee that met daily to decide immediate action items and future planning. Each decision of war policy had to be approved by the three Chiefs of Staff, but if this committee had "doubts or differences", plans would go to the newly established Defense Committee of the War Cabinet, including Churchill and the Ministers of the three services (army, navy and air force) with the Chiefs of Staff present. A member of the Defense Secretariat, reflecting on Churchill's leadership, saw the Prime Minister who "provided the flow of ideas, the stimulus and drive, and the political guidance". This system, in Churchill's words, is a design "to help me in giving a vigorous and positive direction in the conduct of the war, and in overcoming the dead weight of inertia and delay which so far led us to being forestalled on every occasion by the enemy" (Gilbert, 1991, p. 673).

6. Education, viewed as an accumulation of knowledge and experience, provides a high threshold of individual memory and, thus, an aptitude for mental search, as in a person knowing about 75,000 words in his memory of a language (Oldfield, 1966) or what the poet Coleridge (1863) described as an "unpremeditated arrangement of words, grounded in the habit of foreseeing, in each interval part, or (more plainly) in each sentence, the whole that he then intends to communicate". On the four qualities of individual intellectual, Coleridge (1863) presciently defines *talent* as "the comparative facility of acquiring, arranging, and applying the stock furnished by others and already existing in books or other conservatories of intellect"; *sense*, "the balance of the faculties which is the judgment – what health is to the body"; *cleverness* "a comparative readiness in the invention and use of means [. . .] a genius for instrumentality"; and *genius* as "originality in intellectual construction".

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Corresponding author

Charles J. McMillan can be contacted at: charlesmcmillansgi@gmail.com