

Organizational Forgetting: Comparison with Atkinson-Shiffrin Human Memory Model

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Abstract: The focus of this paper is on organizational memory (OM) and organizational forgetting. In the present paper an attempt has been made to see how organizational structure (i.e. specialization and standardization) influences OM. Paper also tries to link Atkinson and Shiffrin model of human memory to OM and focuses primarily on forgetting aspect of organization. Accidental forgetfulness dimension along with its two modes, failure to consolidate (new knowledge) and failure to maintain (established knowledge) has been taken into account for linking organizational forgetfulness to human forgetfulness and simultaneously propositions have been developed. Further, after relating Atkinson Shiffrin model of human memory to organizational memory, an attempt has been made to relate few theories of individual forgetting to organizational forgetting and retrieval of information. Here retrieval is taken into account, as forgetting from long term memory (LTM) is due to retrieval problem and not due to storage problem.

Key words: Organizational Memory • Organizational Forgetting and Atkinson Shiffrin Human Memory Model

INTRODUCTION

The knowledge-based analysis holds that a firm can be conceptualized as body for integrating knowledge [1]. Based on works by Dierickx and Cool [2], DeCarolis and Deeds [3] organizational knowledge can be represented as stocks of knowledge that grow through flows of increasing knowledge (organizational learning) and shrink through flows of depreciating knowledge (organizational forgetting). Scientific research on knowledge management has focused on the processes of knowledge creation, use and transfer, but has devoted little attention to the processes of knowledge degradation and destruction. In 1970s and 1980s, the topic of organizational forgetting has been studied by a few researchers working in the areas of operations and organization theory. The initial contributions by Wickelgren [4] and Anderson [5] were developed in the area of operations and are based on the study of the degradation of knowledge due to interruptions in the production process. In the field of organization theory, researchers such as Hedberg [6] and Nystrom and Starbuck [7] developed the concept of unlearning to illustrate a type of intentional forgetting.

Organizational experience leads to organizational learning, which, in turn, produces organizational knowledge that is stored in organizational memory. Understanding how organizations remember and store knowledge is an important research issue that has received increased attention in general organization studies [8-11], as well as in knowledge management [12].

The persistence of organizational features suggests that organizations have the means to retain and transmit information from past to future members of the social system. This capability can be called organizational memory (OM). Organizational memory is commonly defined in terms of the contents of organizational memory and the processes associated with organizational memory. OM may involve the encoding of information via suitable representations, which later have an effect on the organizations, as members interpret the stored information in the light of current organizational conditions. OM is the means by which knowledge from the past is brought to bear on present activities, thus resulting in higher or lower levels of organizational effectiveness.

Previous research on OM suggests that it is not a one-dimensional and undifferentiated concept. A distinction between different dimensions of OM which

is generally accepted is that between the different OM retention facilities. Walsh and Ungson [11] distinguish between different retention bins: the 'individual retention bin' (individual recollections of what has transpired in organizations), 'cultural retention' (how members of the organization think, feel and perceive problems), 'transformational retention' (the logic that guides the transformation of input in organizations), 'structural retention' (how organizations reflect and store information about the organizational environment) and 'ecological recollections' (the actual physical or workplace ecology of an organization).

As literature suggests not much work has been done on OM. This term OM itself suffers from lack of consensus. The OM literature knows many varying and sometimes even competing definitions of OM [13]. Individual memory is 'the faculty of retaining and recalling things past' [11]. Earlier research questions whether organizations can actually have a memory. Opinions on this questions range from Argyris and Schon [14], who argued that OM is only a metaphor, to Sandelands and Stablein, who raised the possibility that 'organizations are mental entities capable of thought'. Senge [15] likewise states that: 'Structure influences behaviour: Different people in the same structure tend to produce qualitatively similar results ... more often than it is realized, systems cause their own crisis, not external forces or individuals' mistakes.' Argote *et al.* [16] suggest that organizations can influence organizational learning if they increase the proximity between office members. Even though organizational structure seems to be of some importance in the OM context, organizational theory has had little to say about the influence of the former on the latter.

In the present paper an attempt is made to see how organizational structure (i.e. specialization and standardization) influences OM.

Structure and Their Effect on OM: Pugh and Hickson [17] proposed to look at the influence of organizational structure on OM. Walsh and Ungson [11] and Karsten [18] identify structure as a key variable of knowledge storage and the focus of this paper is to study those different structural dimensions-specialization and standardization-and their effect on OM.

The effects of specialization(the extent to which indirect activities are accomplished by specialists or experts) are of particular interest, as previous studies have shown that specialization can have ambiguous effects on OM. Potentially, it can both increase (Wilkins and Ouchi 1983) and decrease (Huber 1991) information processing

within a work unit. Similarly, earlier studies have proposed differing views on the likely effects of standardization (the extent to which procedures are standardized) on OM. West [20] argues that operating procedures manage to obstruct the learning process, whereas that formal control has a significant positive influence on the utilization of customer product knowledge.

Influence of Standardization on Organizational Memory:

Pugh [17] stated that the dimension 'standardization' deals with the degree of standardization, formalization and automation of regularly occurring events that the organization legitimizes. According to Fredrickson (1986) this dimension can be defined as the extent to which an organization uses rules and procedures to prescribe behaviour such as the details on how, where and by who tasks are to be performed. The notion that standardization influences OM can be dated back to Cyert and March (1963), who find that standard operating procedures are related to the memory of an organization. Similarly Nelson and Winter (1982) conclude that standardized routines represent states of settlement among individual members of the organization that influence the memory of the organization.

Propositions 1: The standardization has a positive influence on the organizational memory.

Influence of Specialization on Organizational Memory:

Favela [25] described specialization, i.e. the division of the value chain into many parts and the concentrating on single task components and offers a number of advantages. It allows the development of specific and deep knowledge, abilities and processes with which these tasks can be completed in an efficient manner. The division of a task into its respective components requires that the task is understood well enough to divide it into its respective components. Specialization entails focusing on a narrow area of knowledge or skill or activity and involves a person's or an organization's adapting for the unusually effective or efficient performance of some particular function, often at the expense of the individual's or organization's ability to perform most other functions for themselves, which are then necessarily left to others with more appropriate skills or talents or abilities [25].

Studies report that a high degree of specialization should have a positive effect on the individual, transformation and organizational memory, since specialization should help the individual to develop a

deeper understanding of the task [26-28] and prevent an information overload [29, 30]. Moreover, specialization requires the processes responsible for transforming all kinds of inputs to be well defined. Furthermore, the structure bin in a highly specialized organization should provide an extended and improved set of work rules and roles that allows the organization to divide and coordinate the tasks efficiently.

Propositions 2: The specialization has a positive influence on the organizational memory.

Organizational Forgetting: Studies suggest that structure has a positive influence on the organizational memory. In relation to memory, important question remain unanswered: Do organizations forget? If so, how and under what circumstances do they forget? It is clear that all of the knowledge that is added to organizational memory does not stay there permanently. Organizational learning relates to the processes by which companies add to stock of knowledge and hence to their repertoire of capabilities. Organizational forgetting conversely is the loss of such knowledge. When companies forget, they become unable to perform something that they had previously been able to do. They lose capabilities and at least in some cases, competitiveness.

Organizational forgetting has been defined as the intentional or unintentional loss of organizational knowledge at any level [31], as well as changes in beliefs and routines.

The concept of "organizational forgetting" has arisen in at least three contexts. First, research has shown that simply being able to create or transfer knowledge is not enough. Instances in which newly obtained or created knowledge disappears before it has been successfully transferred to the organization's long-term memory have been documented [33], leading to the conclusion that avoiding forgetting newly acquired knowledge is an important part of effective learning. Second, several studies have shown that organizational memory decays over time and important pieces of knowledge may be forgotten if organizational memory is not maintained. Third, several writers have argued that forgetting is sometimes an organizational necessity, such as when an existing dominant logic needs to be replaced by a new one. In this case, forgetting is understood as positive and a failure to forget leads to an inability to change.

Holan and Phillips in their book on 'organizational forgetting' suggested the varieties of organizational forgetting, which is divided into three modes.

- Organizations can fail to successfully integrate knowledge transferred from another organization, or created internally, into its memory system. In knowledge transfer processes are allowing, some knowledge to make its way from an external organization to organizational memory, but some part is being lost. Similarly, knowledge creation activities are producing knowledge on an ongoing basis, but some of that knowledge is dissipating before it is successfully integrated into memory. In both cases, knowledge enters the organization but then there is a failure to integrate it into the memory system and so it is lost.
- The second mode occurs when knowledge is successfully integrated into memory, but is lost due to a failure of the memory system. When this occurs, the organization loses some capability and some effort will be required to recreate the knowledge that was lost.
- The final mode involves knowledge that has made its way successfully into the memory system, but then is purposively forgotten. There are several possible reasons why an organization may want to forget. For example, organizations may need to forget some kinds of knowledge as part of an organizational change effort. Alternatively, it may be simply that the ongoing maintenance of the knowledge is consuming valuable organizational resources despite the fact that the organization no longer requires the knowledge.

Following initial contributions, organizational forgetting has been studied mainly from two standpoints. The first standpoint considers forgetting (or unlearning) as an intentional process of discarding organizational knowledge or routines to make way for new ones. The second standpoint sees forgetting as an accidental or unwanted process of degradation of the organizational knowledge.

There is paucity of literature in the area of organizational forgetting. Previous researches which arethereraise important questions in this area. What are the different ways in which organizations forget? What are the underlying dimensions in the dynamics of forgetting?

Holan, Phillips and Lawrence (2004) made an important contribution in this area and identified two underlying dimensions leading to four distinct modes (Fig. 1). First, they distinguished between accidental versus purposeful forgetting and then whether the process of forgetting involves newly acquired knowledge or knowledge already embedded in the organization's memory system.

Fig. 1: Modes of organizational Forgetting

	New Knowledge	Established Knowledge
Accidental	Failure to consolidate	Failure to maintain
Purposeful	Abandoned innovations	Managed unlearning

Accidental Forgetting:

The Inability to Retain New Knowledge: This mode involves the inability of an organization to retain a new piece of knowledge that has been made available to it and that has had some effect on collective action. It may have been transferred from another organization, or it may be an innovation, but despite its entry into the organization, it is lost before it can become embedded in the organization's memory. This is not to say that individuals do not remember; it means that the organizational procedures, routines, etc. are no longer active. The new knowledge has not become embedded in the organizations memory and therefore requires the constant attention of the manager to ensure proper completion. Holan *et al* infers this as a failure to consolidate knowledge into the memory system of the organization. It is not that the organization is unable to perform; it is that knowledge is unstable and will disappear (preventing the organization from achieving a successful collective performance) if the conditions that hold it in place disappear or are altered in a significant way.

The Deterioration of Stored Knowledge: In addition to the loss of new knowledge, it is also observed several instances of knowledge degradation, where the quality of the organizational performance diminished unexpectedly some time after having reached a satisfactory level. This type of knowledge deterioration is well documented (Argote *et al.* 1990, Darr *et al.* 1995, Epple *et al.* 1991). It is possible to understand that knowledge degrades when it is unused. But here the knowledge in question was used daily. What underlying processes of forgetting explain this phenomenon? The problem was determined by the turnover of critical personnel and their inability or unwillingness to create collective knowledge that would enable a successful collective action without their presence or immediate supervision.

According to Carley (1992) and Rao and Argote (2006), the literature identifies some causes for the unlearning and forgetting of organizational capabilities; however, turnover is one of the most important. On one hand, the research about the causes of the turnover has been studied in depth; however, few papers have studied the consequence and the effects of turnover (Staw, 1980). On the other hand, although the relationship between

turnover and organizational learning has been studied in the past (Carley, 1992), there are few mentions of the relationship between turnover and organizational unlearning and forgetting.

Purposeful Forgetting

Managing to Forget New Knowledge: So far, studies have presented the undesirable side of forgetting. In both cases, forgetting deprives the organization of a resource and affects the organization's ability to behave in particular ways. However, there are occasions when forgetting is functional. This may happen when learning has occurred, but the new knowledge interferes with existing activities or turns out to be undesirable in some other way. The organization learned, but it became apparent that it was not appropriate and the managers had to move quickly to break the new routines, change the new structure and re establish more workable routines and structures. Although in this case the knowledge had been transferred from another organization in the form of a structure, similar phenomena were observed in organizations that had developed their own knowledge in the form of successful innovations. Studies report that organizations that were good at innovating also had to be good at forgetting, because they had no a priori guarantee that their innovation would be adequate for their organization in their particular context. Organizations that "found" solutions for problems had to be prepared to acknowledge that the solution they had found may not be adequate for the overall organization. Organizations skilled at innovating and learning found themselves more often in the situation where they needed to discard what they had developed. Many experiments meant a lot of forgetting and inadequately managing this process led to a decrease in performance as organizations picked up bad habits. Successful innovative organizations probably possess more and better mechanisms to prevent new knowledge from entering their memory systems.

Managing to Forget Established Knowledge: This mode of forgetting identified involves voluntarily forgetting established knowledge-what is called managed unlearning. Here, managers worked to forget established knowledge that was, or was perceived to be, a barrier to increased organizational effectiveness. Although the idea that what you already know can be a barrier to further learning is well developed (Schultz 1998, March *et al.* 2000), to extend this argument by suggesting that a necessary condition for new knowledge to emerge is the adequate management of the process of forgetting.

Human Memory and Organizational Memory: In this section of the paper, an attempt is made to link Atkinson and Shiffrin model of human memory to organizational memory and focus is primarily on forgetting aspect of organization. Individual don't have the ability to purposefully forget things which are stored in their memory. Residues of memory will remain in human unconscious or subconscious part of mind even if person tries to forget any incident or event of his life. In purposefulness forgetting, abandoned innovations and managed unlearning in organization can be linked to interference theory of individual forgetting which is dealt later in this paper.

In this paper accidental forgetfulness dimension along with its two modes, failure to consolidate (new knowledge) and failure to maintain (established knowledge) will be taken into account for linking organizational forgetfulness to human forgetfulness.

Available Literature Relating Human Memory to Organizational Memory: Very few studies are there which tries to compare organizational memory to human memory. If an Organisational memory system provides a perfect memory, what are the consequences? Luria's (1968) seminal study, *The Mind of a Mnemonist*, suggests that a perfect memory may hinder an individual's normal functioning because of the subject's inability to distinguish reality from imagined worlds: "Indeed, one would be hard put to say which was more real for him: the world of imagination in which he lived, or the world of reality in which he was a temporary guest." Similarly, when organizations find ways to reliably and, possibly, automatically retrieve information from their Organizational memory system, the information does not necessarily reflect the different frames of reference or preferences that exist. Decisions may be subject to "encased learnings" that may not be valid or responsive to environmental changes [11]. The perfect memory of an ideal organizational memory system could, like Luria's subject, overload individuals' and decouple the organization from the current reality.

Some studies are conducted answering this question: can an individual or an organization function without a memory? When an individual loses his or her memory of the past events (i.e. retrograde amnesia affecting episodic memory), Schacter (1996) describes loss of semantic memory, "the bedrock of the general knowledge of the world" leaves a person without the ability to retrieve attributes of objects or recall details and the

knowledge of one's life may be quite impersonal. Taken together, the loss of events and facts, leaves a person in the present, sometimes without the ability to communicate and unaware of deficiencies, without a need to plan for the future since there is no past. Sandoe and Olfman (1992) hypothesize that an organization lacking a memory may exist but would "in essence, be paralysed by social amnesia, bracketed off from authentic temporal existence." When an organization does not have mechanisms to provide temporal integration, the organization (Sandoe and Olfman, 1992) exist only in the present moment. Organizations at this extreme continually recreate themselves and are incapable of learning from experience. Schaefer and Fassel (1998) emphasis in original associate the loss of individual memory and the loss of organizational memory to addictive behaviours. Loss of corporate memory, or forgetfulness, is an outstanding characteristic of the addictive organization. People have said of addicts that they cannot learn from their past behaviour, because they have no memory. This is one of the aspects of the disease. Addictive organizations have the same problem.

Available literature suggests that very few studies have tried to compare organizational memory to human memory. Further in none of the studies, researchers have tried to make a link between Atkinson and Shiffrin model of memory to organizational forgetting although many authors have talked about short and long term memory in organizational memory and forgetfulness context. Further after relating Atkinson Shiffrin model of human memory to organizational memory, an attempt is made to relate few theories of individual forgetting to organizational forgetting and retrieval of information. Here retrieval is taken into account as forgetting from LTM is due to retrieval problem not due to storage problem. In most of the organization storage is not a problem, but retrieval is difficult which leads to forgetting.

Atkinson-Shiffrin Model of Human Memory: In 1968 Atkinson and Shiffrin [29] proposed a model of human memory which posited two distinct memory stores: short-term memory and long-term memory.

Short-Term Memory (STM) or "Working Memory": Information that is attended to arrive in another temporary store called short-term or working memory. The more recent term "working memory" is intended to convey the idea that information here is available for further processing. In general information in working memory is

information one is conscious of and can work with. Information that enters STM fades away, or decays as soon as it is no longer attended to. Information that is being actively attended to is represented by a pattern of neural activity in the brain, a process referred to as storage. But information that is not more permanently stored is simply lost shortly after attention is directed elsewhere.

Because STM presents severe limits on the amount of information that can be held in mind simultaneously and on the duration for which it lasts once attention is withdrawn from it, STM has been described as the bottleneck of the human information processing system.

Long Term Memory (LTM): Long-term memory is the relatively permanent memory store in which one holds information even when one is no longer attending to it. Information held in LTM is not represented as patterns of neural activity (as in STM), but rather as changes in brain wiring -- in the "conductivity" of existing synapses and in the formation new synapses and destruction of old ones. Storing information in LTM is equivalent to a computer writing information out to its hard drive, or to a tape recorder writing patterns of magnetization onto tape to record music. The recording process is called storage and the "playback" process, retrieval.

Capacity is unlimited in the sense that nobody seems to run out of the capacity to store new information, even if they live beyond 100 years. If they did, then either they would stop learning entirely or new learning could only take place by first erasing something already stored in LTM. This does not appear to happen -- when storage/retrieval capability is lost it is due to deterioration of brain systems rather than to systems exceeding their holding capacity.

It is difficult to determine how long memories can exist in LTM. If one cannot remember something once knew, is it because it has been lost from the system, or because one has developed a problem locating it for retrieval? Permanent losses do occur as a result of brain damage and it is possible that some memories simply decay away if they are not accessed for a very long time.

A common idea is that everything we have ever experienced has created a long-term memory, but this is unlikely to be so. Much of what we experience is never attended to or not attended to beyond a few brief moments and probably does not result in activation of the storage process.

Atkinson and Shiffrin model of Human Memory and Organizational Memory

Short Term Memory (STM): In this paper it is assumed that STM in organization is in mind of people but not institutionalized and integrated into the organizational memory. Organizational forgetting happens from STM if organizations fail to incorporate new knowledge into the broader organizational memory. Relating to the Holan and Phillips (2004) mode of forgetting, in this scenario there is inability to retain new knowledge. This is not to say that individuals do not remember; it means that the organizational procedures, routines etc. are no longer active. Company neglects to make valuable new information to the rest of the organization and that knowledge becomes lost when certain individuals leave or work teams disband or change. Here the knowledge used is still in working memory as it is used daily but the problem is driven by the turnover of critical personnel and their inability or unwillingness to create collective knowledge. To prevent that, information must be captured from individuals and made institutional - a process that involves a range of activities to routinize, codify and store knowledge. Also, certain types of information, such as a company stories, myths and other forms of discourse, must be embedded into the organization's culture. In case of high attrition rate of an organization, knowledge cannot be institutionalized and there will be loss of knowledge or one can say there will be loss of knowledge from STM

***Proposition 3:** Loss of knowledge from STM memory is positively related to attrition rate of organization*

***Propositions 4:** Forgetting of organizational knowledge from STM is negatively related to the degree and quality of efforts put into activities that keep knowledge in the organization*

Long Term Memory (LTM): In LTM as it is stated that storage is not a problem but forgetting happens when there is a retrieval problem. A company often forgets things that have long been embedded in its organizational memory. Concepts, practices and even values can be unintentionally lost, here things are already stored in LTM but the problem is with retrieval of this information. This forgetting can be due to various reasons.

- **Misplacement of Knowledge:** Knowledge is misplaced and people are unable to locate that place from where knowledge can be retrieved

- Technology shift: The focus is on change in systems which store knowledge. The knowledge has not been transformed into new systems then this will cause retrieval problem. E.g. Lotus notes were replaced by excel, but knowledge has not been transferred from lotus to excel and therefore retrieval of information is difficult
- Specific Skills: In certain situation where a specific skill is required by organization to use certain knowledge and person expert in that particular skill has left the job. In this scenario, retrieval problem can arise.
- Environmental change- In this case, knowledge is not relevant due to environmental change. Knowledge is stored in organizational memory but still it has not been used for longer duration.

Proposition 5: *Forgetting in organization from LTM happens more likely due to retrieval problem than storage problem.*

Theories of Individual Forgetting: Several theories of individual forgetting are widely accepted and form the basis for this section.

- Cue-dependent forgetting theory by Tulving [28]: Cue-dependent forgetting means that information is stored in the long-term memory but there is no suitable retrieval cue from the environment to prompt memory. This means that information is available but is not accessible. Tulving split cue-dependent forgetting into two different types.
- State dependent forgetting: It is the physical/physiological state of the person when the information is encoded and retrieved, examples of these are, happy or sad, alert or tired etc. State-dependence suggests that recall is improved when encoding and recall are undertaken under similar psychological states. These are internal cues.

Way in which affect influences cognition involves its impact on memory. Here, two different kinds of effect seem to occur. One is known as mood congruence effects. This refers to the fact that current moods strongly determine which information in a given situation is noticed and entered into memory. In other words, current moods serve as a kind of filter, permitting primarily information consistent with these moods to enter into long term storage. Second, affect also influences what

specific information is retrieved from memory, an effect known as mood dependent memory. Current moods, serve as a kind of retrieval cue, prompting recall of information consistent with these moods.

In organizational forgetting, from state dependent retrieval perspective, if knowledge sharing in organization is associated with incentive then a positive affect will be associated with this mechanism of knowledge sharing.

- Context dependent forgetting: This is the environment setting or situation in which the information is encoded or retrieved. Context dependence suggests that when the environments are similar during encoding and retrieval, remembering will be improved. These are external cues.

This in the case of organizational forgetting will be of not much relevance.

- Theories of interference posit that existence of old memories and new memories either displace or inhibit recall. While the capacity of long-term memory is assumed to be large (if not unlimited) and relatively permanent, some researchers posit that interference causes displacement or the complete loss of an item from memory and other researchers posit that the strength of the connections between concepts is inhibited.

In either case, retroactive interference is the inhibition by new information of the recall of older information; a process which may be more active in an information rich and dynamic environment or Retroactive interference occurs when newer information learned interferes with remembering previously learned information.

When old memories inhibit the recall of newer memories, proactive interference occurs and may block the assimilation of new information or Proactive interference occurs when something that we previously learned interferes with remembering newer information.

These two problems of retroactive and proactive interference in organizations can be solved by focusing the two modes of purposeful forgetting.

- In retroactive interference, managing to forget new knowledge mode will help to resolve this problem.

- While in case of proactive interference, managing to forget established knowledge model will help to resolve problem of proactive interference

Conclusion and Future Research: One can conclude that organizational forgetting has received less attention in literature. Studies which are there on organizational memory and forgetting lacks consensus.

Therefore to address this scarcity of literature in this area, an attempt has been made to study organizational forgetting and to link it with human memory. Walsh and Ungson in their paper [11] do not cite a single quantitative empirical study on OM and this situation has not changed much over the past 15 years (Lien *et al.* 2007; Olivera 2000; Stein and Zwass 1995). A number of authors have studied OM qualitatively, but only very few studies have attempted to empirically test propositions formulated by OM scholars (e.g. Ackermann and Halverson 2000; Olivera 2000). This lack of empirical examination is unfortunate, as it hinders the identification of stable relationships of OM with important organizational outcome variables and hinders the practical application and theoretical advancement of OM theories. Some scholars have even asked whether OM should be abandoned as a concept (Ackermann and Halverson 2000) if it remains empirically unexamined. Consequently, researchers know very little about the relation between organizational structure, processes and OM, i.e. what its organizational antecedents are and how exactly organizations remember.

Further from the point of view of organizations, future research may consider the consequences of OM for the organization. It may be that OM has an influence on performance or performance related variables. Secondly, future investigations might also examine the evolution of OM in organizations with that in other types of organization, such as family firms, low growth businesses, or government agencies. More theoretical work is required to address the question of how stored knowledge can be retrieved and recalled from the various organizational repository bins. Such information should enrich the understanding of OM. Some researchers have argued that when examining OM, it is important to fully understand how dispersed stored knowledge is collated. Finally if the propositions offered in this paper are supported empirically, there are important practical implications of this work.

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