

Information Brokering in Globally Distributed Work: A Workarounds Perspective

Completed Research Paper

Introduction

The study of information exchange in globally distributed work (GDW) has taken interest in how information can be shared efficiently and securely (Levina & Vaast 2008; Leonardi & Bailey 2008). To complete GDW, information about their individual tasks is shared across complex organizational and geographic distances (Levina & Vaast 2008; Leonardi & Bailey 2008). Prior research has established that information users need timely access to important task-related information but face challenges receiving information across time differences, knowledge distances, and often complex information systems (Leonardi & Bailey 2008). Prior research has also established that those managing information need to secure the quality and accuracy of information but face challenges when they interact with multiple, distributed, senders, users, and receivers who often have different information needs (Leonardi et al 2016).

One solution that has received growing attention is the use of intermediaries to broker information (Boari & Riboldazzi 2014; Soderberg & Romani 2017; Quintane & Carnabuci 2016). Intermediaries connect information between multiple users that would otherwise be disconnected (Leonardi & Bailey 2013). For instance, intermediaries mediate to make information visible, easily accessed, and understandable (Currie & White 2012; Pawlowski & Robey 2004). Intermediaries use their position to find and share good ideas (Leonardi & Bailey 2013; 2017). Intermediaries are also useful tools for overcoming cultural or professional differences and encourage trust and information sharing (Newell et al. 2007; Soderberg & Romani 2017). At the same time, intermediaries protect information being transmitted and received (Mehta & Bharadwaj 2015). For instance, intermediaries buffer communication to reduce unwanted distractions or information overload (Mehta & Bharadwaj 2015). Intermediaries filter information to minimize transfer of inaccurate information (Mehta & Bharadwaj 2015). Intermediaries are also useful mechanism for stopping unauthorized access to information and protecting against external entities from accessing valuable intellectual property (Mehta & Bharadwaj 2015; Pawlowski & Robey).

However, for intermediaries to effectively broker information, exchanges need to remain visible. While in theory, all information exchanges are mediated (Mehta & Bharadwaj 2015), controlled through legal contracts (Gopal & Gosain 2010), and supported by information technology (Leonardi & Bailey 2008; Oshri 2008), in practice information exchanges often happen outside of formal systems. For instance, the instinct of information users can be to find shorter, easier ways to get work done by going straight to the source (Cram & Gallupe 2016). Despite this, existing research has paid little attention to the challenges intermediaries face when information is not visible or how, in practice, intermediaries broker information effectively. Drawing on a qualitative case study in a globally distributed finance function we use a workarounds approach (Davison & Ou 2013; Malaurent & Avison 2016) to show how the intermediary shared service unit (SSU) broker information when they become aware of information exchanges that are in violation of formal procedures. Information workarounds for straightforward queries were quicker, easier and resulted in more efficient resolutions. However, problems and errors were hidden from the intermediary resulting in process inefficiencies and risks to information security. It is within this context that we seek to shed light on how brokers broker information when information is invisible to them.

Our paper makes significant theoretical contribution to information exchange literature by drawing attention to information visibility. Prior exchange literature has often taken for granted the ability of intermediaries to find and access information (e.g. Ancona & Caldwell 1992). Consequently, research has not fully understood the challenges intermediaries face brokering information when information is invisible. Our workarounds approach addresses this important gap in our understanding and shows how intermediaries broker information across complex, distributed settings (Leonardi et al 2016; Mehta & Bharadwaj 2015) that create conditions to distort and hide information. We draw on data from two groups:

those sharing and receiving information, and those mediating it to explain how, in practice, intermediaries have to negotiate information visibility and make allowances for how information is exchanged.

Our workarounds approach, also contributes to a small but growing body of research which aims to understand how brokers broker (see Quintane & Carnabuci 2016 for a call to research). In line with existing research we confirm that brokers play two integral roles: connecting information and protecting information (Mehta & Bharadwaj 2015). However, in light of workarounds, we find a new, third role: regulating information. Our research suggests that intermediaries are often not able to perform both roles simultaneously, as prior literature has set out, and instead have to make decisions about when to connect and when to protect information. Our complimentary third role builds on current understanding of how intermediaries broker information under complex or ambiguous circumstances which demand a more flexible approach to brokering.

Our paper also shows the normative complexity of workarounds. Workarounds are often perceived as negatively affecting the integrity and security of information (Azad & King 2011) or positively affecting the flow of information (Cram & Gallupe 2016). However, our case demonstrates the wide range of effects workarounds have, ranging from encouraging creativity and problem-solving, to hiding information, as well as, helping to mediate the flow of information between teams. We find workarounds are neither positive nor negative but are negotiated to allow for complexity in distributed work settings. We also provide insights for those managing SSU and similar intermediary units by suggesting how one unit balances the competing demands of connection and protection by regulating information and provide examples of specific regulatory behaviors.

Globally distributed work and information brokering

Information exchange can be practically complex, highly politicized, and hard to manage. Prior research has identified numerous specific challenges organizations face exchanging information across globally distributed and diverse teams (GDW) (Levina & Vaast 2008; Oshri et al 2008). For instance, geographic distances have been found to reduce the frequency, quality and convenience of information exchanges and make sharing information and ideas more challenging (Levina & Vaast 2008). To give a practical example, a team in New York, USA may need information from a team performing work in Bangalore, India. However, teams are subject to delays due to the working hours of a team in Bangalore, who are 9.5 hours ahead of New York. Further, teams are also expected to use formal systems for exchanging information which may require paperwork to be completed before they are able to send or receive information. Research has found that practically, sharing information can be cumbersome and slow (Cram & Gallupe 2016). Different knowledge bases, derived from doing different work, has also been found to create challenges for exchanging information (Kotlarsky et al 2014; Leonardi & Bailey 2013). For instance, research suggests that teams need common understanding, such as shared language, lexicon and perspective, to collaborate effectively (Levina & Vaast 2008), benefit from each other's knowledge, or jointly problem solve (Jarvenpaa & Majchrzak 2016). Research also suggest that organizational boundaries, that is the structural divides between one team and another, create challenges for exchanging information (Levina & Vaast 2008). For instance, research suggests that teams are often concerned with the opportunistic behavior of 'outsiders', risks to intellectual property where it is difficult to determine "who owns the code" (Chen, Bharadwaj & Goh 2017), and sharing information that may help to make their own jobs redundant (Ravishankar & Zimmerman 2014). Often this protective behavior results in hiding information (Ravishankar & Zimmerman 2014).

It is not surprising then that organizations have turned to intermediaries to broker information. Brokering is the management of knowledge (Currie & White 2012), information (Leonardi & Bailey 2013), or ideas (Leonardi & Bailey 2013) across otherwise disconnected groups (Burt 1992). Brokering has been studied by scholars across disciplines, with particular prevalence in Organization, Management Studies and Information Systems research, to understand how information can be mobilized and received by different groups across an organization. More recently, information brokering has gained attention in the context of GDW: including offshore software development (Mehta and Bharadwaj 2015; Soderberg & Romani 2017) and offshore digital engineering services (Leonardi & Bailey 2013). For instance, in a study of offshore software development Mehta and Bharadwaj (2015) draw attention to the additional complexity of GDW and find that protective roles (that of the sentry and guard) in particular are often more important in outsourcing scenarios due to the multiple organizational boundaries.

Most recently, studies have drawn attention to the increasing complexity of information exchange in GDW. Studies from both industry and practice agree that organizations are distributing more work and that the work they are distributing is more complex and knowledge intensive (KPMG 2014; Oshri et al. 2015; Soderberg & Romani 2017; Leonardi 2017). Consequently, brokers are becoming an increasingly important facet of information exchange. Interestingly, while broker teams are traditionally employed by organizations, recent studies find that brokers also emerge from existing teams. For instance, in the offshoring context, Leonardi (2017) finds that offshore teams, who had been considered “low-status” and who had been performing “low-value work”, were increasingly becoming centers of innovation. In his insightful paper, Leonardi shows how these “low-status” teams, took the opportunity to broker information and sell ideas to create value for the organization. Specifically, the study suggests that these teams made “connections between, and combinations of, ideas that result in new products, processes, or services” (p.118). While the paper makes significant strides into understanding the positional advantage (mediating interactions with multiple teams) and status disadvantage of these offshoring teams there is more to understand about how, in practice, teams are able to broker information under these circumstances.

Information workarounds

Clearly, in order for intermediary units to be effective brokers it is imperative that they are aware of the information exchange. A big challenge intermediaries face, in brokering information, is when information is exchanged directly. On one hand, direct communication allows some queries to be dealt with more quickly and efficiently. However, ongoing information exchanges between teams can cause backchannels to open up and information to become invisible to the intermediary. One unintended consequence of these back-channels is that the intermediary is not able to protect the integrity or flow of information. Drawing on the notion of ‘workarounds’ (Davison & Ou 2013; Ferneley & Sobreperez 2006), we define information workarounds as information exchanges without official sanction.

Workarounds are a deliberate act of non-compliance with official policy (Alter 2014) in order to overcome real or perceived obstacles to workflow (Davison & Ou 2013; Malaurent & Avison 2016). In order to work around obstacles, individuals or groups diverge from formal procedures or systems put in place to manage and control processes (Ignatiadis & Nandhakumar 2009). The detrimental and unintended consequences of workarounds have been widely explored (Alter 2014; Azad & King 2011; Ferneley & Sobreperez 2006). Broadly, this group of studies has shown how workarounds lead to low adoption rates, threaten information security, misaligned system objectives, impact subsequent activities, and reduce returns on investment. For instance, research has found that workarounds increase the risks to information security. In a study focusing on ERP implementation Boudreau and Robey (2005) find employees worked around a desktop automatic ‘log-off’ security feature by asking other employees to ‘click’ on their screens to save time. However, as authors suggest, these avoidant actions bypass important security features which risk information integrity, have legal implications, and risk patient safety (Azad & King 2008). Studies have also demonstrated how workarounds can encourage user resistance by providing an alternative to formal systems and new technologies (Boudreau & Robey 2005). A key issue with workarounds GDW is that they become invisible to intermediaries. It stands to reason that workarounds are often hidden from management making them difficult to identify (Alter 2014). Instead, workarounds hide errors or inefficiencies that should otherwise be flagged and corrected (Gasparas & Monteiro 2009). Consequently, problems with formal systems and processes often go unnoticed until more severe problems emerge (Gasparas & Monteiro 2009).

Only recently, research has begun to explore the advantages of workarounds (Cram & Gallupe 2016; Malaurent & Avison 2016). The most immediate advantage being that they assist the continuation of work and can reduce bottleneck effect on subsequent activities (Ferneley & Sobreperez 2006; Cram & Gallupe 2016). For instance, Ferneley and Sobreperez suggest that workarounds compensate for flaws in existing systems by creating ‘idiosyncratic methods of data collection, data management or working practice, in effect ensuring essential task completion” (2006 p. 347). If they can be identified, workarounds also signal obstacles in formal work practices that need to be overcome. For instance, workarounds have been found to signal a poor user functionality and over-complicated processes (Cram & Gallupe 2016). In GDW, the use of intermediation and formal systems, designed to ease information sharing, are often deemed bureaucratic and cumbersome (Cram & Gallupe 2016) and may signal an opportunity to improve information exchange. Further, workarounds, by nature, point to an alternative, quicker, if not more

efficient, way of getting things done (Ferneley and Sobreperez 2006; Safadi & Faraj 2010). In this respect, workarounds may be a source of creativity or innovation (Boudreau et al 2016). Literature supports the notion that “hacks and workarounds are the soul of innovation” as they invite creative solutions from ground level beyond top down directives (Norman 2008 p.48). Consequently, workarounds often become adopted as formal, or recognized informal practice (Safadi & Faraj 2010). Despite the potential benefits, research suggests that organizations go to great lengths to reduce existing workarounds and discourage them from emerging (Ignatiadis & Nandhakumar 2009; Rivard & Lapointe 2012). As Rivard & Lapointe note, there is sparse literature that focuses on the implementers and their response to “dysfunctional” workarounds once they have become routinized (2012 p.898). As organizational complexity increases workarounds become part of how information is exchanged. It is often not possible or useful to eradicate short-cuts and therefore it becomes increasingly important to understand how to manage them. In the following sections we present a case of an intermediary financial shared service unit (SSU), examining how the intermediaries broker information when distributed teams exchange information that is invisible to them.

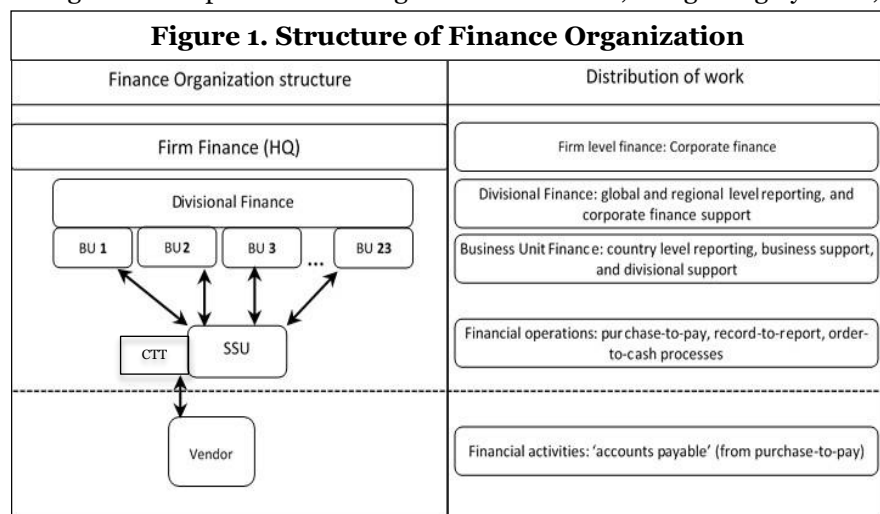
Design and case selection

Rationale

Given our intention to better understand the specific challenges intermediary teams face when brokering information across multiple boundaries we adopted qualitative case study methods (Klein & Myers 1999). Qualitative case study methods are a particularly useful tool for exploratory research and helps to advance understanding of complex issues in a real-life context (Eisenhardt 1989; Kotlarsky et al. 2014). Case study methods also enabled us to triangulate interview with more objective data such as internal documentation (Yin 2003). We took an interpretivist approach to data analysis and have reported data that emerged organically from a broader case study on globally distributed teams, change and challenges.

Case Background

Our research is set in a large global logistics firm who employ over 490,000 people in 220 countries worldwide. The firm is divided into four main business divisions run for the most part as individual organizations governed by their own management teams. Each division operates from country level business units which provide logistic services to a range of business (b2b) and individual customers (b2c). In 2008 the firm’s largest business division took the decision to move some financial operations out of the finance teams in the country business unit (BU) and into a newly created financial shared service unit (SSU). The aim of the SSU was to focus on performing the financial processes more efficiently from one location at a reduced cost. As a result, the SSU was tasked with providing a range of financial operations, including Purchase-to-Pay, Record-to-Report, Order-to-Cash, and General Ledger, back to the business unit finance teams (BU) across Europe (on which this research focuses), as well as, Asia and the Americas. In addition, the SSU were tasked with improving financial processes through standardization, integrating systems, implementing new tools to improve the transparency and efficiency of information exchange across the organization. The aim of the BUs, who had previously performed the financial operations, was to focus on alternative financial activities. BUs typically consisted of a CFO and small financial controlling team (between 3-8 people) who were responsible for country level financial planning and reporting. The BU teams were expected to spend more time responding



to requests for financial information from regional and global finance teams. BU teams were often required to provide financial reports used for division and firm level forecasting and audits to meet legal requirements. They also helped the operations and sales teams, within the business unit, to improve their financial position and improve end customer experience with financial services. Figure 1 shows the structure of the finance organization and the distribution of work amongst teams.

In 2011 the SSU outsourced accounts payable activities, from the Purchase-to-Pay process, to a third-party vendor in Bangalore (vendor). Accounts payable involves processing invoices which are received from the business' suppliers (e.g. a utility firm who has provided power to the office). Invoices are sent by the business' suppliers to the vendor who input the invoice into a payment system and initiate the payment. The payment is then made to the supplier and recorded for financial documentation and reporting. The aim was for the SSU to further reduce the cost of finance and free up internal SSU resources for process improvement and standardization projects. However, the SSU team then also had to manage the third-party vendor. In order to do this effectively, the SSU team developed a small team, known as the 'control tower team' (CTT), within the SSU, to mediate information exchanged between BUs and the vendor. We focus on how the intermediary SSU (including the control tower) brokered information. See Table 1 for definitions of the financial processes and finance teams.

Teams and Terms	Explanation
Business Unit Finance (BU)	Finance team who sit within individual country level business units. The team, usually consisting of a CFO and a team of 2-8 people, are responsible for financial planning, reporting, and audits (legal requirement) for their country business unit.
Shared Service Unit (SSU)	Financial operations team who sit within a centralised unit in Europe. The team perform several financial processes and deliver them back to BU teams or directly to the Business' suppliers.
Control tower (CTT)	Controlling team which sits within the SSU. The team was created to manage the vendor and to interface with BU teams for delivery of accounts payable activities.
Vendor	Third-party vendor based in India. The team perform and deliver accounts payable activities for the SSU. This activity results in the payment of business supplier invoices and allocation (charge) to BU financial statements (e.g. profit and loss).
Business' Suppliers	Firms or individuals who provide goods or services to the firm who require payment. These payments are usually financially allocated (charged) to individual country level business units. For example, utility companies, or other logistics firms.
Purchase-to-pay	A business process that involves purchasing and paying for a good or service. Activities include: purchasing/ordering a good or service, receiving it, paying for it, and then accounting for it.
Order-to-cash	A business process that involves receiving and fulfilling customer orders. Activities include: receiving customer order for a good or service, documenting the order, fulfilling the order, shipping or performing the order, creating and sending an invoice, receiving payment and then recording payment in the general ledger.
General ledger	A set of accounting records held by a firm. The ledger contains records of all financial transactions that are used to prepare (legally required) financial statements such as cash flow, income statements and balance sheets.
Accounts Payable	A short-term debt payment activity. Accounts payable are money owed by a business to its suppliers. These are recorded in a sub-ledger when an invoice is produced and cleared why accounts are paid.
Key Performance Indicators	A measure used to evaluate the performance of teams against pre-defined targets. These targets are usually tied to contractual obligations or bonuses.
Service Level Agreements	A contract between a user and a service provider that defines the expected service and any conditions or parameters.
Standard Operating Procedures	A set of (usually step-by-step) instructions which prescribe how an activity is performed. SOPs are used to codify knowledge, reduce miscommunication, increase efficiencies and reduce mistakes.

Fieldwork

In total we conducted 26 interviews. All interviews were face-to-face, except three, which were via teleconference. Each interview lasted between 60 and 140 minutes and, with the permission of our informants, all interviews were audio-recorded and later transcribed verbatim. In addition, we collected and analyzed internal documentation including annual reports, internal communications, performance dashboards, employee opinion surveys, and employee development schemes. We used documentation to better understand the structural organization, the distribution of work across teams within the organization, how information flows and more specific examples of how and when teams communicate. We also took the opportunity to spend some time in the offices talking informally with various informants, as well as, capturing photographs of the offices and working environment.

As illustrated in Table 2, data was collected and analyzed in three rounds between 2015-2016. The first round of interviews were conducted with SSU members in their Netherlands based head office. With the help of an SSU manager we selected interviewees from a range of management positions. The interviews were semi-structured around the distribution of work across the finance function, as well as, the challenges that informants faced in their work and collaborating with one-another. Informants were asked to elaborate or give examples of 'how' and 'why' they think situations or events occurred, as well as, how they managed them. The intention was to let interesting themes emerge (Walsham 1995; 2006) from this first round of data collection whilst beginning to understand interactions, workflow, and challenges of GDW. We transcribed all interviews from the first round of interviews, studied the data, and made extensive notes to identify emerging themes of each interview individually. We then combined the interview data with documentation and field notes which helped us to map organizational structure, reporting lines, workflow and responsibilities, as well as, understand different group objectives (using KPI information and performance metrics). With this we set about identifying common themes across the first round of interviews. The notion of information control and information bypassing the intermediary unit emerged organically from the data across all interviews. The majority of interviews referred to the direct exchange of information between the BUs and vendor teams in detail and how it had impacted on the informant's role.

The second round of interviews also took place at the SSU head office. Interviewees included additional SSU managers and managers from the firm's finance department. The second round of semi-structured interviews were designed to confirm and further explore the challenges SSU informants faced and better understand how they manage them. If information bypassing did not emerge organically from interviews then we asked informants if they were aware if teams communicated directly with one-another, why this might be, and how useful this was for them. However, we were conscious of asking specific questions and took care not to lead the informants. We transcribed all interviews from the second round, studied the data, and made extensive notes to support or evolve emergent themes, and made extensive notes on new ones. The third round of interviews were conducted with CFO's and their immediate teams from four different BUs (UK, France, Belgium, and the Netherlands). The primary purpose of these interviews was to understand how BU members experience and cope with challenges in their own work, and in collaborative projects. BU members were asked to describe their relationship with the vendor team and the nature of their communication. If BU members had communicated directly with the vendor team informants were encouraged to elaborate on why and what the outcomes had been. Again, we transcribed all interviews, studied the data, and made extensive notes to support or evolve emergent themes, and made extensive notes on new ones.

Round	Informants	Interviews	Primary Purpose	Outcome
1	SSU members	9	To understand the global organisation of the finance functions, changes to the role of the SSU, and challenges they face	Notion of information workarounds emerged. Sense of frustration from SSU members.
2	SSU and Firm Finance	8	To better understand the challenges the SSU face in their own work, and in collaborative projects. To understand how SSU members cope with challenges.	Workarounds explored. Developed understanding of how information exchange is managed.

3	BU members	9	To understand how BU members experience and cope with challenges in their own work, and in collaborative projects.	Workarounds explored. Developed understanding of why workarounds emerged.
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Data Analysis

In line with Eisenhardt (1989) we analyzed empirical data through an iterative process of studying emergent findings and theoretical concepts. As described above, this process began directly after each interview. We made notes about emergent themes, how they related to other themes, and how they compared with theoretical concepts we were interested in. We also followed this same process after each round of data collection. As we were interested in the differences between teams (structural position and assigned work) we also paid attention to the differences and similarities between informant groups – BU and SSU interviews. Finally, with a complete set of empirical data we conducted a systematic analysis, loosely coding first order themes before returning to theory for guidance. For instance, we made extensive notes on all data referring to information exchanges, information bypassing, motivations, consequences, and how they were managed or resolved and created a table organizing them by theme (Strauss & Corbin 1998). SSU interviews in particular referred to important roles or behaviors they engaged in to mediate information exchanges. From the table we coded these mediation activities into second-order interpretive concepts: protecting, connecting, adapting or being pragmatic. Having tentatively selected second order themes we referred backwards and forwards to theory and the data to help us to understand and explain them. We focused on themes identified in the literature as key tensions such as distances in distributed work, challenges of managing information across distance, as well as, spanning and brokering strategies. While brokering literature helped to explain notions of protecting information and connecting discrete teams the third concept did not seem to be covered by existing literature. We revisited summaries and quotes before the third theme of ‘regulating’ emerged and no other modifications to the thematic coding was deemed necessary. Broad thematic coding and sub-coding were undertaken in Nvivo 10. For the purpose of confidentiality, when reporting data, informants will be referred to in groups: SSU informant (including the control tower team) and BU informant.

Case Analysis

In the following sections we show the challenges the SSU faced brokering information across BU and vendor teams who workarounds formal communication channels and exchange information directly. To broker information, the SSU team played three main roles – Protector, Connector and Regulator. The SSU team described limiting direct communication exchanges to make sure information was secure and, at the same time, allowing direct communication exchanges to make information readily available. We found that SSU teams adapted their behavior based on interpretations of how important information was, and their ability to protect or connect information. The SSU team were also reflective about the specific resources they needed to be able to regulate information.

How brokers connect information

BU and vendor teams communicated directly, via telephone or email, in order to give or gain specific information that was not readily available to them. These exchanges bypassed formal communication channels, such as standardized forms and systems, put place by the SSU to mediate information. According to informants, BU and vendor teams worked around formal systems in order to get specific information they needed that was not otherwise available to them. For instance, BU teams contacted vendor teams to understand why invoices had not been paid or when the payment would be made to their suppliers. BU informants also suggested that they often needed to access information more quickly than formal routes would allow. For instance, BU teams described how their suppliers often rang the BU to complain that their invoice had not been paid. If the BU did not resolve payment issues quickly and effectively then suppliers escalated complaints to BU management or, more drastically, stopped providing their services. One BU informant suggested that this had once been the case with an energy firm who had threatened to cut power to the business.

If I have an urgent escalation, basically a subcontractor hasn't been paid for whatever reason and is escalating and threatening to stop the service, then I'm not going to wait for somebody in SSU to pick it up. It needs to go fast. I'll pick up the phone or send an email to get a prompt response. (BU Informant).

Vendor teams often contacted BU teams, or their suppliers, directly when information was missing from invoices. In order for vendor teams to process invoices they required a specific set of information such as purchase date, supplier name and details, and type of purchase. However, different BUs (and their suppliers) often had their own ways of working which were not captured in formal instructions. Some invoices were handwritten by 'one man' delivery drivers and some sent electronically from large utility companies. Invoices came in different languages and were also sent in to the SSU through different methods – post, email, or online. As a result, vendor teams often needed clarifications or additional information to finish processing an invoice.

The SSU were aware that some BUs and the vendor “don't play the game” (SSU informant) and communicate directly. However, SSU teams also felt that some direct information exchanges were inevitable. SSU team described that they did not perform the accounts payable activities themselves and therefore did not understand enough about specific invoices, such as supplier code numbers, to answer queries themselves. As one SSU informant suggested:

You can't stop countries having direct contact to discuss a number of their issues...It's difficult to have detailed conversations about an invoice that went totally 'belly-up' because we didn't see it. We could see it on the IT infrastructure, we could get out the images, but there were no operational people here in the SSU doing this bit of work. (SSU Informant).

Further, SSU members described that they did not have enough resources to mediate all communication exchanges. An SSU informant explained that thousands of invoices were sent from the BU, and the business' suppliers, to the vendor to be processed. Many invoices required some clarification or additional handling due to exceptions, missing information, or mistakes. SSU informants suggest that they do not have enough staff or time to be able to handle all these calls themselves so had to connect vendor and BU teams.

One way in which SSU teams connected information across teams was to standardize the invoicing processes across BUs making it easier for the vendor. According to informants, the idea was to better connect information so exchanges could be seen through formal infrastructure. The SSU team employed standard tools (such as common methods for collecting invoices, coding systems which could be applied to invoices systematically, and individual supplier codes to identify repeat suppliers) to make some information more readily available to teams and more visible to the SSU. In addition, the SSU provided the vendor with a contact matrix (a directory of contact details for people in BU and SSU teams) and instructions specifying who they should contact for what query. SSU informants suggested the idea was to enable the vendor to quickly access information but only from specific contacts. This allowed the SSU team to more easily identify information exchanges that they did not physically mediate.

SSU teams also connected information by mediating relationships. Interviews with both BU and SSU teams revealed that BUs often avoided formal target review meetings with the vendor. One BU informant suggested “We don't want to see them. We don't even want to talk about them in the meetings”. According to BUs, they struggled to overcome language (or accent) barriers and cultural distances that made communicating difficult. For instance, BU informants suggested that the vendor were often too “sales orientated”, their presentations were “dull” and team members were “too defensive” of criticism. SSU informants also acknowledged the challenge:

They want to look good. That's obvious when they visit and also when we have these monthly management meetings. They just say “everything is fine. There's no issue on our side.” (SSU informant)

To connect teams, the SSU ran monthly Service Performance Reviews meetings (“SPRs”) in which the vendor, the SSU delivery managers, and the BUs met to discuss performance. According to the SSU, these meetings were also often used to share information between teams. For instance, teams often discussed changes that would impact on other teams and how they might implement changes across all teams. In addition, SSU members were present to monitor and capture the exchanges. One SSU manager explains:

We do want to have the links in our SPRs. It adds value because if we get a question on performance or something that just pops up that hasn't been escalated the vendor can answer immediately. That very often leads to "Oh okay, we need to look into that process". I also think it's good that the BU sees that because sometimes they have an understanding in their head of what we should do and what the vendor should do. (SSU Informant).

SSU teams also used their intermediary role to promote their role connecting information. For instance, the SSU used their understanding of the requirements and preferences of individual BUs to implement new technology solutions. According to SSU informants they produced better reports than BU teams had previously had access to, reduced the number of hours BU teams need to spend on reports, and shared information and best practice between BUs. This was acknowledged by BU informants. For instance, one BU informant reported:

From time to time I have direct contact with the vendor but then it's basically just during the service performance reviews. The vendor take the lead in presenting the performance and the issues from the past month. The whole format was developed by the SSU. They know exactly what needs to be reviewed with us (BU Informant).

Table 3. Summary of connecting behavior	
Role	Connecting behaviour
Connector	<ul style="list-style-type: none"> • Make information more easily accessible to separate teams <ul style="list-style-type: none"> ○ Make information more visible through formal systems and tools ○ Make information more understandable through standardization • Encourage interaction between BU and vendor teams <ul style="list-style-type: none"> ○ Create a platform for open discussion ○ Encourage trust building ○ Encourage information sharing ○ Empower the vendor team to lead discussion

How brokers protect information

From the SSU's perspective, information workarounds undermined the SSU's ability to control the quality of information and make sure processes were being performed efficiently. According to SSU informants, BU teams used information workarounds to push through local adaptations (exceptions to standard operating procedures) and prioritize urgent invoices. SSU informants described that this was often at odds with the standard processes they had in place to manage invoices efficiently across Europe. SSU teams had to give equal priority to urgent requests from 22 other European BUs, as well as, avoid a build-up of regular invoices to meet their own process targets.

We don't want 10 CFOs to speak to the vendor and influence them. If you allow that the vendor starts to change processes to please one CFO, change the same process in another way for another CFO, and it will go in all directions. Plus, we cannot control that. (SSU Informant)

SSU informants explained that adhoc requests for information, from BU teams to vendors, were often not supported with detailed instructions. Requests made in a hurry, over the telephone or via email, were often not followed up with clear and up-to-date instructions (standard operating procedures) for the vendor. Instructions gave the vendor specific direction on how to perform activities. From the SSU experience, instructions were an integral part of supporting the vendor to perform tasks accurately, to avoid misunderstandings between teams, and avoid errors in how activities were delivered and recorded. One SSU manager described a conversation between themselves and a vendor manager:

We had a situation where I asked the vendor myself – 'What is your instructions when you write an email to a business' supplier for some information and you get an Out of Office?'. The vendor said 'We send another email the next day'. I said, 'But in the Out of Office it says they will be back next week?'. The vendor said, 'then we have to escalate it'. So I asked the vendor, 'If the Out of Office says "please contact Mr X or Mrs Y", then why wouldn't you just contact that person?'. The vendor said, 'It's not in the instructions'. Ok fair enough. It's not in the instructions. So we wrote it in the instructions. We had to re-write them so many times. (SSU informant)

SSU informants also suggested that workarounds gave the vendor an opportunity to underperform. Vendor's performance was measured against agreed contractual obligations (Service Level Agreements). For example, the vendor was obligated to process a specific number of invoices per day. However, according to the SSU informants, vendor teams often claimed that they missed targets because they had prioritized BU requests.

The BUs put the vendor in a position to really take advantage of us. They say "Well, the country asked me to do this and now you're telling me to do this." We really have to manage the vendor. (SSU informant)

SSU members were also concerned that issues dealt with locally were not being identified and fixed. One SSU member explains:

If there's an issue they just go ask the vendor to solve it but they do not look at the root cause. The people who should be involved are not involved (the SSU). The issue is 'solved' but then it comes over and over and over again. (SSU Informant).

However, according to SSU informants, they did not have the influence over BUs to insist BU teams used formal communication channels. Instead, to protect information, SSU teams focused on pressuring the vendor teams not to oblige BU requests. SSU members described using formal contracts (e.g. SLAs) to re-emphasize formal protocol and standard procedures. This included what the vendor's role was, what information should be shared with the SSU, and what information should be shared with BU teams.

SSU teams were also aware that they could not control information exchanges that were invisible to them. However, one way in which SSU teams protected information was to monitor for reoccurring problems. For instance, SSU informants described that backlogs and build-ups of unprocessed invoices indicated that invoices were being processed more slowly than expected. Reports supported by the SSU's performance management team showed how many invoices 'should' be processed based on previous process rates and targets. Deviations from this amount signaled to the SSU to investigate. According to SSU informants, complaints or 'escalations' from BUs about poor quality or untimely invoice payments also signaled to the SSU to investigate. Specifically, SSU teams used 'trackers' and 'logs' to monitor issues and escalations. The team used these to identify reoccurring issues, investigate cause, investigate blame and seek long-term resolutions. SSU informants used "CAPA logs", "Corrective action and preventative action" to identify, correct, and prevent issues from reoccurring. As one SSU explains:

We review the instructions (SOPs) and discuss what works, what doesn't work, and improve processes. We take the trackers to what the impacts were and see how we avoid this from happening again. We ask the vendor to do the same. If they've done something wrong we also see if they should have known better? If so, they will have to put in a corrective action and preventive action. If it wasn't captured in their instructions then it's our job to fill the hole and improve them. (SSU informant)

According to SSU informants, another important part of their role was protecting BUs from being over-run with calls from the vendor. Some BUs complained that calls were unnecessary and time consuming. From their perspective, BUs did not have resources to assist with vendor calls and queries. One BU informant suggests:

We get infuriated if we get five calls in a month. That's five too many. We should have zero because there is a control tower in place. I don't care if the control tower or the SSU has outsourced to the vendor. As far as I'm concerned I've outsourced it to the SSU so that's my contact point. (BU informant)

Beyond their attempts to protect information that would reduce process efficiencies, the SSU team were also concerned that BUs questioned the SSU's intermediary role. The SSU team described recruiting overqualified personal in the control tower team to actively interface between BU and vendor teams. The idea was that the control tower team "close down" communication from the vendor, re-emphasize formal job roles and responsibilities. In turn the control team focused on resolving issues before they reached the BU teams.

Table 4. Summary of protective behavior	
Role	Protective behavior
Protector	<ul style="list-style-type: none"> • Guard the quality of information <ul style="list-style-type: none"> ○ Make instructions more thorough and clear ○ Discouraging adaptations to processes • Discourage interactions between BU and vendor <ul style="list-style-type: none"> ○ Limit BU influence on vendor by enforcing formal contracts and operating procedures with the vendor ○ Limit vendor calls to BU teams by explaining job roles and formal channels to the vendor • Monitor symptoms of the information workarounds <ul style="list-style-type: none"> ○ Monitor backlogs and build-ups of unprocessed invoices ○ Monitor complaints or ‘escalations’ from BU teams

How brokers regulate information

SSU teams adopted a flexible, pragmatic approach to information exchange. For instance, SSU informants described that it was often challenging to protect information at the same time as connecting information across teams and had to find a compromise.

There is a clash between how much time we can spend on collecting data, how much we can ask the BUs to give us, and what information is available. It's not terribly complex to deal with, but under the constraints that we have in terms of resources and time it becomes significant. (SSU informant)

One way SSUs regulated information exchange was to be selective about when they enforced formal communication channels and procedures and when they enabled information to pass directly between teams. For instance, SSU managers made decisions about what information they considered ‘integral’ or ‘high risk’. This was generally information that, if missing from formal information systems or had errors, would result in reoccurring problems and create more substantial errors in information (e.g. financial documents) or those that would directly impact the BU teams. For instance, SSU managers protected coding files. Coding files were created jointly by the BU and SSU teams, were maintained by the SSU teams, and were used by the vendor to process invoices. Coding files included important information about business suppliers, account numbers, and where costs should be allocated. This information was integral to wider accounting and financial processes such as balance sheets and profit and loss accounts. According to SSU informants, issues with coding files caused information workarounds to increase as teams needed more clarification from one another to complete invoice processes. For instance, coding files had missing supplier information, had double entries where one supplier had more than one code, or codes had not been updated to include changes in how costs should be allocated. To limit the threat, the SSU team reasserted the importance of their intermediation activities and encouraged teams to use formal systems to report coding errors. A control tower informant reported:

Coding is a typical question that should not go directly. We have coding files, we need to update it, and we need to make sure BUs don't get the same questions again. We will contact the vendor. We will contact to train the BU team. It could be caused by a change in the BU, in which case we might decide to set up a weekly call to discuss and take questions. Instead of getting many emails you can join once a week and we'll consolidate the questions. Then we update the necessary trackers, coding for us etc. (SSU Informant).

According to SSUs an important part of regulating information was also to understand the restrictions other teams faced. For instance, in performance review meetings (SPRs) SSU members encouraged the vendor to identify what information they needed (and did not have easy access to) and what challenges they faced completing their own work:

We really have to play the two roles. When it's about performance it is not grey – it's good or it's not good. Targets are there to be met. But when we talk about issues, improvements, and how to resolve them we are really working in partnerships. We have a lot of informal discussions with vendor managers (SSU Informant).

SSU teams also used SPRs to understand the challenges BU teams faced. For instance, SSU informants suggested that some BU teams get a particularly “hard time” from their management. According to SSU teams, they tried to accommodate preferences and resource limitations of different BUs. Some BUs did not want direct exchanges with the vendor, some only when necessary, and some took an active interest in building a relationship with them. One SSU informant described:

The CFO of Belgium BU does not want the vendor on his calls. Then we really have to make sure they don't get questions they should not get...Norway BU is very interested in supporting and contacting the vendors... UK BU does not want to get supplier escalations because the finance team there get the heat for it if invoices aren't paid on time. Their business does not get angry at the vendor, they get angry at the local finance team. (SSU Informant).

According to SSU informants, SSU members let some information workarounds happen by connecting teams but stepped in when workarounds became a problem. For example, if they felt ‘too much’ information was being shared between teams, if they felt information being shared was “too important”, or if communication was perceived by BUs as ‘too often’. One SSU manager in the control team described:

We do want to have the conversations going. It's not a bad thing. I believe you should be able to go directly to who has the answer if it's set up that way. If it gets too much then we will get an escalation from the BU. For Denmark BU, which is a small country, we now have an escalation. It's our responsibility to make sure the BU knows our role. We close conversations down again and explain the roles. That needs to be re-explained at least once a year because it changes. We have new tools so there's always change. Denmark will be fine for a while but if the vendor has somebody new then it will happen again. We go in circles. (SSU Informant).

However, SSU members worry that the ‘profile’ of some of their team were not able to handle this more flexible role. SSU managers hired over qualified or over experienced personnel to work in the control tower to broker information effectively. According to SSU informants this included the ability to negotiate and liaise with managerial roles. The control tower was tasked with making informed decisions about when to protect information integrity and when to connect teams to encourage direct exchanges. One SSU manager described how the control tower was developed:

When we outsourced we thought we just need to track information and communication. But we realized that the person also needs to be strong enough to talk to the BUs, to communicate well, and to talk to the vendor. The people who do the best are the ones who think. They talk to the technical guys, they ask questions to follow-up, they talk to the BUs. They only go back to the BU after they know the solution. We're looking really for somebody who's proactive, who's not afraid to give the feedback to Vendor, who's not afraid to dig, flags the issue, and think with the process. (SSU Informant).

Table 5. Summary of regulatory behavior	
Role	Regulatory Behavior
Regulator	<ul style="list-style-type: none"> • Be selective about when to protect information and when to protect information <ul style="list-style-type: none"> ○ Decide what information is integral to protect ○ Discuss and negotiate the priorities of other teams • React to symptoms of workarounds by increasing protective behavior • React to cause of workarounds by increasing connective behavior • Reflect on ability to regulate

Discussion and implications

Our research relates to a plethora of studies which have taken interest in explaining and resolving information exchange problems in GDW (Levina & Vaast 2008; Leonardi & Bailey 2008). Practical barriers such as geographic distances, language differences, and complex systems create distances between teams that can be hard to overcome. In addition, less tangible hurdles such as knowledge differences, cultural divides and trust issues, can mean teams are less willing to try to overcome them. It has been a common observation in studies of GDW that intermediary units, such as bridging organizations, brokers, or gatekeepers, are an essential part of managing information exchange across disconnected groups (Burt

1992; Pawlowski & Robey 2004). Brokering perspectives in particular have pointed to intermediaries as an important conduit of information. In line with this, our analysis shows that intermediaries can indeed plug gaps between teams, mediate, and to some degree, control information exchange. Our findings concur that intermediaries play two important brokering roles:

First, we support existing research which suggests that intermediaries broker by connecting teams and information (Currie & White 2012; Leonardi & Bailey 2013). The intermediary creates direct links between teams and encourage direct conversations by simplifying and standardizing otherwise complex and discrete systems. In doing so, information is more easily transferred and translated between teams. The intermediary creates a common language and avoids misunderstandings by creating a shared set of rules, procedures and channels for sharing information. The intermediary also provides the space for connecting teams to discuss reoccurring problems and find joint resolutions as well as sharing new ideas. For example, in our case the SSU created a physical forum (Service performance review meetings) where the vendor and BU teams came together regularly to discuss issues directly with one another. All teams agreed this was a valuable format for flagging information issues as well as creating understanding between the teams.

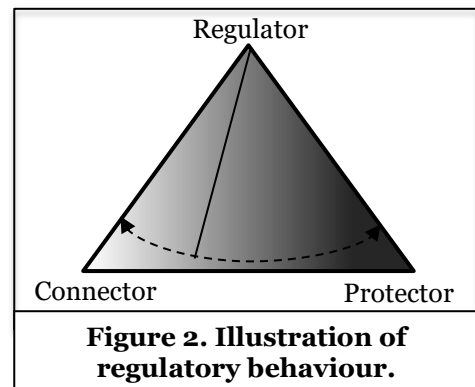
Second, we support existing research which finds that intermediaries broker by protecting information (Mehta & Bharadwaj 2015). The intermediary, like many recognized in prior research, is accountable for the quality of information being shared between teams and, ultimately, the efficiency of processes relying on that information. Our findings suggest that, in the globally distributed context, the intermediary team focus on enforcing formal information channels, and reemphasizing specific job roles, to clarify the divides between teams. The intermediary created an interface to buffer and filter information being exchanged between teams. The intermediary also reverted to formal contracts and obligations to enforce formal communication channels. However, in addition to the two traditional roles identified by brokering research, our analysis revealed a third important role – the regulator (Illustrated in Figure 2.).

Regulating workarounds

Intermediaries, in performing their two roles, are designed to ease information exchanges between teams. However, paradoxically, we also find that the same intermediaries, playing the same connective and protective roles, can also make systems more complex to navigate and require teams to take additional steps to share and retrieve information. Past research has found that workarounds can be a symptom of complex systems and bureaucratic procedures. Under these circumstances, it is often the instinct of information users to find shorter, easier ways to get work done by going straight to the source (Cram & Gallupe 2016). Our analysis shows that teams bypass the intermediary unit and exchange information directly. From the teams' perspective, workarounds enabled them to meet time-sensitive or urgent requests for information, or to prioritize local needs that were not being fully met by the intermediary.

From the intermediary's perspective, information workarounds caused issues for their ability to connect and protect information. The intermediary found that direct exchanges made crucial process information invisible to them. Issues were resolved locally and not investigated and corrected at a global level. This meant issues were often re-occurring and wide-spread across teams causing process inefficiencies. Information was also not being properly maintained or reported causing risks to information security (and in this case, financial reporting which has legal implications). However, our analysis gives interesting insights into the practical limitations of intermediaries brokering information. Intermediary teams were also aware that their ability to enforce formal protocol and communication channels were limited. First, the intermediary had limited resources to mediate all information exchange. Second, the intermediary had limited knowledge of specific processes to be able to assist all information exchange. Third, the intermediary was aware of the teams' need for quick and flexible access to information that was being restricted by their mediation. Consequently, to some degree intermediaries were also reliant on information workarounds to relieve their workload and ensure information flows efficiency between teams.

Consequently, the intermediary takes on a third role: Regulator. Findings suggest that unlike protecting and connecting roles,



which each required stability and predictability of information exchange, the third role required the intermediary to be flexible, reasonable, and reactive to changing information requirements. For instance, the intermediary made decisions about whether to connect or protect depending on the (changing) preferences of the teams they were working with. The intermediary made decisions about how much direct communication they will accommodate before escalations are made. The intermediary were also selective about what information they should protect and what information can pass directly between teams. The intermediary was realistic about exchanges they had the knowledge to support. In order to broker information effectively, the intermediary hired profiles capable of better judging ambiguous situations, dealing with difficult stakeholders and negotiating outcomes. Analysis supports the idea that in reality, solutions to complex problems are defined or at least adjusted 'ex-ante'. Instead, intermediaries regulate information by making alterations, adjustments and personnel changes to cope with emerging information needs.

Theoretical Contributions

Our paper makes significant theoretical contribution to information exchange literature by drawing attention to information visibility. Prior exchange literature has often taken for granted the ability of intermediaries to find and access information (e.g. Ancona & Caldwell 1992; Mehta & Bharadwaj 2015). For instance, Ancona & Caldwell describe how intermediaries connect information by scouting across disconnected teams and being an ambassador who translates meaning. The study assumes that the broker has a positional advantage to see information across silos. Consequently, research has not fully understood how intermediaries broker when information is invisible. Our workarounds approach addresses this important gap in our understanding and shows how intermediaries broker information across complex, distributed settings (Leonardi et al. 2016; Mehta & Bharadwaj 2015) that create conditions to distort and hide information. Further, we draw on data from two groups: those sharing and receiving information, and those mediating it to explain how, in practice, intermediaries have to negotiate information visibility. For instance, how much information they are able to collect and how much information users are willing to make visible.

Our workarounds approach, also contributes to a small but growing body of research which aims to understand how brokers broker (Quintane & Carnabuci 2016). In line with existing research we confirm that brokers play two integral roles: connecting information and protecting information. For instance, research has found that brokers connect information and ideas across otherwise disconnected groups (Burt 1992) using work digitalization and social networks (Leonardi & Bailey 2017). Research has also found that brokers protect information by guarding and filtering what information is exchanged across organizations (Mehta & Bharadwaj 2015; Quintane & Carnabuci 2016). However, in light of workarounds, we contribute a new, third role: regulating information. Our research suggests that intermediaries are often not able to perform both roles simultaneously, as prior literature has set out. Instead intermediaries face limitations and have to make decisions about when to connect and when to protect information. Our complimentary third role builds on current understanding of how intermediaries broker information under complex or ambiguous circumstances which demand a more flexible approach to brokering. In doing so we contribute to understanding understand the role of flexibility and creative adaptation in inter-organizational collaborations (Jarvenpaa & Majchrzak 2016; Ravishankar 2013). In public policy contexts, Ravishankar finds that complex questions are answered through willingness to experiment, take initiative, and the flexibility to adapt with new challenges (2013). Our research builds on these ideas to show how information brokers take a pragmatic approach to workarounds and make context driven decisions.

Further, brokering research has focused on the structural and positional resources of brokers as they influence information exchange. For instance, research has shown how intermediary units are a structural tool for positional advantage (Burt 1992; Leonardi & Bailey 2017). However, in line with Wang (2015) and Quintane & Carnabuci (2016) we find that positional advantage does not translate to brokering success. The theory and evidence we present advances a novel, pragmatic perspective on how brokers broker. We find that intermediaries are pragmatic about their ability to broker information. Despite their 'positional advantage' we find that brokers can only broker within their means. In doing so, we contribute to a scarce, but growing body of research which reconciles structural (positional) virtues of brokers, with behavioral views of network brokerage (Quintane & Carnabuci 2016).

Third, our paper show the normative complexity of workarounds. Workarounds often perceived as negatively affecting the integrity and security of information (Azad & King 2011) or positively affecting the flow of information (Cram & Gallupe 2016). However our case demonstrates the wide range of affects workaround have, ranging from encouraging creativity and problem-solving, to hiding information, as well as, helping to mediate the flow of information between teams and compensate for limited resources of those managing information. We extend recent arguments that consider workarounds as paradoxical – both essential and harmful – and find that these impacts are contingent on how workarounds are regulated. We find that teams managing information take a pragmatic approach to workarounds by seeing them as inevitable and findings resourceful ways to work with them. In doing so, we show how workarounds can be managed once they become routinized (Rivard & Lapointe 2012; Malaurent & Avison 2016).

Practical Contributions

We contribute work on the evolution of shared services to explore the increasing demands put on subsidiary units and how they adapt to such pressures. We support a growing body of subsidiary literature to show how, subsidiary units are increasingly becoming masters of their own destiny. Often, like our case Shared Service teams face resources and structural limitations which stagnate a unit's ability to develop beyond its original cost function. That is, often Shared Service units are restrained by their functional remit - to drive down the cost of a function and increase efficiencies. Often this means subsidiary units received limited financial investment and have little decision making authority. It is not surprising then, that recent research has shown how subsidiary units are becoming increasingly resourceful and creative in how they move beyond cost saving to create value for the network and parent firms (Leonardi & Bailey 2017; Cavanagh et al. 2017). For instance Cavanagh et al (2017) show how subsidiary units develop their scope and value to the network by assuming more autonomy rather than being assigned autonomy by headquarters. We extend this by suggesting that SSU teams achieve this by taking a pragmatic and practical approach to their resource limitations, developing skills to see opportunities and develop their ability to 'convince and persuade' outside of official policy. We provide insights for those managing SSU and similar intermediary units by suggesting how one unit balances the competing demands of connection and protection through pragmatic decision making and adaptive behaviors.

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