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ABSTRACT

Firms often innovate with IT due to institutional pressures, which can lead into rash decisions and drive firms to innovate IT similarly, e.g. mimicking the industry leaders. This drives firms to look alike and turn homogeneous. However, recent observations show that firms can actually become heterogeneous while innovating with IT under institutional pressures. We argue that firms can learn from the IT innovation process and they can turn these learnings into better use of the technology, which can ultimately lead to heterogeneous capabilities. Thus in other words we argue that firms can revive disappointing IT innovations due to institutional pressure and turn them into competitive advantages. This study uses case studies to further explore this nascent phenomenon.

Keywords: Institutional theory, resource based view, IT innovation, RFID, capabilities.

INTRODUCTION

Business innovation based on information technology (IT) has become inevitable for successful firms. However, firms often innovate with IT due to institutional pressure and can have adverse consequences. For instance, Walmart's RFID mandate urged many firms to adopt RFID without a clear goal and ERP has caused many firms to change their business processes to be compliant to the ERP 'best practices'. The literature suggests that institutional pressure leads to mindless adoption resulting in isomorphic IT innovation. This implies that firms will lose their identity and become similar. While isomorphism is often observed in IT innovation, there are firms innovating with IT under institutional pressure successfully. However, it remains unclear how firms can become heterogeneous and successful under institutional pressure.

Institutional pressure is described by the institutional theory as a force that drives firms to seek for legitimacy rather than economic rent. In the quest for legitimacy firms will become homogeneous, as the IT innovations are bounded by the institutional pressure. Firms seek for legitimacy in order to gain acceptance and recognition from the institutions. This implies that firms will lose their uniqueness due to institutional pressure and thus firms can rarely innovate with IT to gain competitive advantages under institutional pressure. On the other hand, firms need to explore ways to differentiate from competitors in order to gain competitive advantages. The resource based view (RBV) is a commonly used theory in the IS field to explain how firms can derive competitive advantages from IT innovations. RBV suggests that firms can develop unique capabilities based on their assets and resources. Assets and resources are inputs or outputs and unique capabilities are the processes that can transform inputs into outputs of greater value. Unique capabilities are essential to the firms' success, as they form sustained competitive advantages (SCA) by differentiating from other firms. The two theories seem to be competing, as the institutional theory explains how firms become homogeneous, while RBV explains how firms become heterogeneous. IT innovation is often explained by these two theories, but few researches have studied how the two theories interact and can complement each other.

Conversely, this study attempts to close the gap by using these two theories to explain the observed phenomenon. This study departs from the traditional institutional theory where the theory poses that institutional pressure will lead to isomorphism. However, we propose that IT innovation does not necessarily have to end here and firms can still develop unique capabilities. As a result, firms can become more heterogeneous rather than homogeneous under institutional pressure. This research intends to learn from successful RFID innovation cases. The use of RFID in supply chain management is a novel technology, which is greatly subjected to institutional pressure and many RFID applications are currently still undergoing the IT innovation processes. Through the literature and detailed case studies, we will first learn how firms can achieve SCA from isomorphic IT innovations. The successful turnaround processes will then be conceptualized and mapped into a conceptual framework.

LITERATURE REVIEW

Institutional theory and Resource Based View

DiMaggio et al. [1] discussed that firms are still affected by institutional pressures. They posit that firms do not only need to succeed economically, but also need to establish legitimacy, which refers to the acceptance of a firm within its environment [2, 3]. The pursuit of legitimacy under institutional pressure will lead firms to become isomorphic. Isomorphism suggests that firms become homogeneous by adopting similar processes, structures, and strategies. The institutional theory defines three types of isomorphism, namely: coercive, mimetic, and normative isomorphism. Coercive isomorphism refers to pressure exerted by other firms which the focal firms are dependent on. Institutional pressure can be exerted by parties, such as customers, suppliers, parent organizations, and government agencies. Coercive isomorphism is commonly found in the IS field. For instance, [4] discuss that coercive pressure was found more important than perceived benefits in adopting EDI. Mimetic isomorphism refers to firms imitating influential or successful peers. Mimetic isomorphism is also referred to as the bandwagon effect [5]. Lee and Ö zer [6], for instance, argue that initial publicities on RFID have portrayed overly opportunistic prospective, which led to that many firms jumped on the RFID bandwagon. Normative isomorphism refers to how norms and

values shared in the social networks influence the firm. Normative pressure can be put forth by variety of sources including: accreditation bureaus, trade associations, and peers. Bala & Venkatesh [7], for instance, advocate that normative pressure from a standards consortium pushed many firms to assimilate interorganizational business process standards.

Albeit institutional pressure is certainly present, it is irrational to conclude that all firms innovating with IT under institutional pressure are heterogeneous. As a matter of fact, [2] discussed that firms under institutional pressure are actually becoming more heterogeneous instead of homogeneous. The resource based view (RBV) discusses how firms can create unique capabilities to differentiate themselves from others. RBV discusses how the combination of resources can create a sustained competitive advantage for a firm [8]. Amit and Schoemaker [9] further differentiated capabilities from resources, by arguing that resources are tradable and non-specific to the firm and can serve as the input to or outputs of a process. Whereas capabilities are firm-specific and utilizes resources to form competences and can transform inputs into outputs of greater worth [10]. Capabilities can turn into competitive advantages, when they are unique in the playing field [11]. The VRIN framework discusses that the competitive advantage can become sustained when the capabilities are Valuable, Rare, In-imitable, and Non-substitutable [12, 13]. RBV is especially applicable in the IS field, as RBV provides a framework to evaluate the strategic value of IT resources [14]. The theory provides guidance on how to differentiate from other IT implementations and RBV forms a basis for how IT resources can interact with non-IT resources [15]. The importance of IS resources and capabilities are not specific to a certain technology, as many other studies like [16] demonstrated similar results. Li et al. [17], on the other hand, discuss how the lack of capabilities led to numerous failures in the software industry.

Complementing Institutional theory with Resource based view

Indeed the literature has discussed that firms are still under institutional pressure, but yet many firms can differentiate themselves from the others. Oliver [18] is one of the few to synthesize institutional theory and RBV. She argues that firms must well manage the institutional context to facilitate SCA, which implies that firms can still reach SCA under institutional pressure. However, Oliver's study explained it as a single process, although on three levels: individual, firm, and inter-firm. Swanson and Ramiller [19], on the other hand, used the mindfulness theory to explain the need for firms to strategically balance between mindfulness and mindlessness throughout the entire IT innovation process. Mindfulness implies that firms innovate with IT according to the firm's facts and specifics. Mindlessness implies that firms innovate disregarding the firm's facts and specifics. Thus firms need to make mindful or mindless decisions in the comprehension, adoption, implementation, and assimilation processes of IT innovation. In general, mindful IT innovation leads to better results compared to mindless IT innovation. Butler and Gray [20], for instance, discuss that mindfulness warrants success in IT systems, as they are fragile and complex. Fichman [21] shares similar findings and argues that IT innovation not only depends on perceived benefits or innovation characteristics, but mindfulness is a key moderator of IT innovation. Mindful IT innovation is analogous to RBV, as IT innovation that fits the firm's facts and specifics can make the firms more heterogeneous. In contrary, mindlessness is analogous to institutional pressure as mindlessness is often caused by bandwagon effects [22]. The mindfulness theory posits that firms can be mindless at an early IT innovation process, but firms can still turn it into a mindful IT innovation assimilation. However, to the best our knowledge, literature has not explored how firms can change from a mindless IT innovation process to a mindful IT innovation process.

Swanson and Ramiller claim that past IT innovations show that firms tend to move from mindless to mindful when they get more acquainted with the technology. This implies that firms can learn from IT innovations and change mindless IT innovations into mindful IT innovations. Absorptive capacity is a form of organizational learning which describes the firm's ability to identify, assimilate, and apply new information to commercial ends [23]. Pavlou and El Sawy [24] suggested that absorptive capacity can enable firms to reconfigure existing capabilities to deal with changing environments and absorptive capacity is also found to improve the firm's performance [25]. Zahra and George [26] expanded the absorptive capacity model by differentiating between potential absorptive capacity, which discusses how the firm acquires and assimilate new knowledge, and realized absorptive capacity, which discusses how the firm transforms and exploit capabilities. In that sense, absorptive capacity can actually be seen as a special type of capability, which helps firms to develop other capabilities [27]. To be more specific, the 'absorptive capacity' capability is also described as dynamic capabilities. Dynamic capability discusses the firms' ability to integrate, build, and reconfigure resources and capabilities to address the changing environments. Hence, firms could learn from IT innovations under institutional pressure and through the firms' absorptive capacity develop unique capabilities.

THE PROPOSED FRAMEWORK

Literature suggests that institutional pressure is a major reason to innovate with IT. However, institutional pressure causes the IT innovations of firms to become homogeneous. This is dubious as many IT innovations have proven to enable firms to create competitive advantages. We therefore will investigate in IT innovation and discuss how the proposed conceptual framework can help firms to turn institutional pressure into unique capabilities and sustained competitive advantages.

Indeed many firms often innovate with IT under institutional pressure. Typically, institutional pressure leads firms to seek for legitimacy, and in our case firms seek legitimacy through IT innovation, which will cause the firms to become isomorphic. Isomorphism implies that firms lose their identity and thus their potential competitive advantage (see Figure 1). However, successful firms need to differentiate from others and cannot permit themselves to become isomorphic. We therefore feel there

is a need to look beyond isomorphism. IT innovation can, according to RBV, lead to assets and resources like equipment, infrastructure etc. Successful firms can bundle and transform these assets and resources into unique capabilities, and when the unique capabilities are valuable, rare, in-imitable, and non-substitutable the capabilities can turn into SCA (see Figure 1).

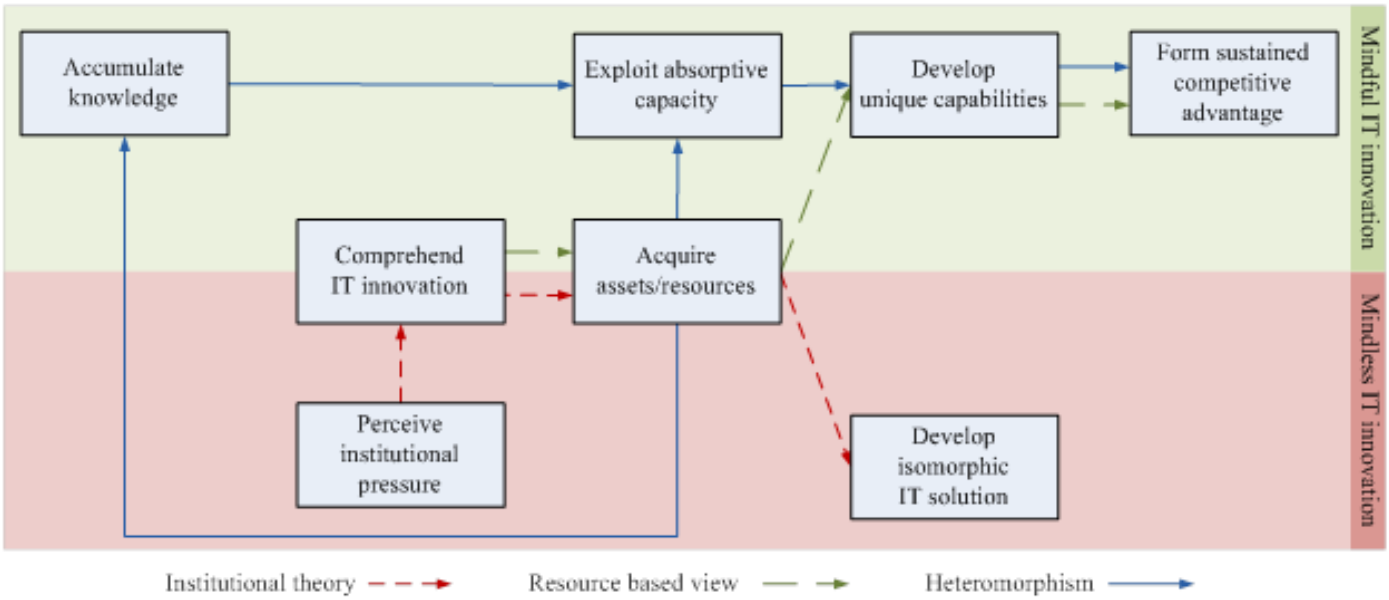

Figure1. Proposed conceptual framework

Institutional pressure can catalyze IT diffusion, but IT innovation under institutional pressure usually does not bring out the full potential of the technology [28]. Wade and Ramiller [14] argue that firms become more mindful when they become acquainted with the technology. Note that mindful IT innovation can help firms to form SCA (RBV) and mindless IT innovations can lead to isomorphism (institutional theory), as aforementioned. We therefore posit that firms can learn from isomorphic IT innovation and eventually turn the acquired assets and resources into unique capabilities. Thus institutional pressure is positive in a way since it catalyzes the IT diffusion, but usually only end up firms with assets and resources. Assets and resources alone seldom provide firms huge benefits. Therefore, firms should make the best use of the IT diffusion and learn how to make use of these assets and resources through their accumulated knowledge and absorptive capacity. Proper use of absorptive capacity can help firms to make better use of the assets and resources and turn them into unique capabilities. In case the absorptive capacity is not adequate to turn the assets and resources into unique capabilities, the lessons learned from isomorphic IT innovations can still enrich the accumulated knowledge in order to increase the absorptive capacity for future use. When the unique capabilities can satisfy the VRIN criteria they can form SCA. Note that the proposed conceptual framework is different from dynamic capabilities, as dynamic capabilities discuss how firms can change or reconfigure existing capabilities. While our proposed framework discusses how firms can develop capabilities from existing resources through their absorptive capacity.

CASE FINDINGS

This study aims to develop a nascent theory to explain a phenomenon that is observed in the industry and that cannot be fully explained by existing theories. We therefore conducted case studies, as this is a research strategy that is suitable for the early stages of theory development [29]. Although, existing theories cannot fully explain our observed phenomenon, we did let the Institutional Theory, Resource Based View, Mindful IT Innovation, and Absorptive Capacity form our a priori assumptions [29].

We obtained a list of potential firms that fit this study based on GS1's past Hong Kong RFID Award winners from 2008 to 2012. This list ensures that the IT innovations are recent and successful. We kept collecting cases until additional cases did not bring additional insights. This resulted in six cases, which falls within the suggested number of cases between 4 and 10 [29]. Based on initial discussions, the firms agreed to participate under the condition of remaining anonymous. This study therefore refers to the firms with pseudonyms and withholds information that would reveal their true identity. All the relevant RFID innovations of the six participating firms are included and resulted in a total of 14 RFID innovations.

Semi-structured interviews were used to gather the information of the six participating firms. The level of analysis for this study was on a firm level and project level, given that firms often have multiple RFID innovations. We arranged a two-step case protocol, where we would first conduct an interview based on a semi-structured questionnaire. Subsequently, we would arrange a second interview to confirm our findings and ask for additional information. The case findings were then transcribed

and analyzed by a panel of three experts.

The case findings revealed that institutional pressure is indeed a main motivator to innovate with RFID. Five out of the six firms innovated with RFID due to an institutional pressure. These innovations typically did not lead to unique capabilities. However, firms often treated these innovations as an opportunity to explore and learn about the technology. Findings suggest that firms often would further innovate with RFID. The further innovation usually is not an enhancement of their first RFID solution, but they would rather use the technology for new initiatives. These initiatives, on the other hand, are free from institutional pressure and do indeed lead to more satisfying results.

The cases show that firms often intentionally tap on to the market to quickly acquire a RFID solution to satisfy the institutional pressure. They often choose to use third party solutions, as they have a technological expertise. This allows the firms to have a quick and easy access to the technological expertise. The firms will intentionally be actively involved the implementation with the intention to explore its possibilities and understand its limitations. They will use their use their absorptive capacity to identify, assimilate, transform, and exploit the newly gains information. Once the firm are confident enough that the technology can improve their unique capabilities and have the technological expertise, they will tend to self-develop the subsequent IT innovations.

However, not all firms can gain the technological expertise from the IT vendors. Therefore, the firms need to have a learning capacity in order to absorb the new information and have a certain level of IT capabilities. If these two aspects are not in place, then the firm is unlikely able to continue to innovate with the technology by themselves. Findings show that firms can increase their learning capacity by being more hands-on with the technology. For instance, firms can help to provide support and bug fixes, involve users in the project, share successful cases, and have top management support.

DISCUSSION

This study explains a phenomenon that is observed from practitioners where IT innovations under institutional pressure can turn heterogeneous by developing unique capabilities. Current literature cannot fully explain this phenomenon and we propose a conceptual framework to explain it. Our framework leverages on two rather juxtaposing theories, Institutional Theory and Resource Based View, bridged by Mindfulness in IT innovations. Institutional Theory discusses that firms turn homogeneous under institutional pressure. In contrast, Resource Based View discusses that firms need to be heterogeneous in order to thrive in a competitive environment. The proposed framework explains how IT innovations under institutional pressure can still mindfully become heterogeneous over time and lead to unique capabilities through Absorptive Capacity.

Case studies are utilized to confirm the conceptual framework. The findings show that Institutional Theory and Resource Based View can partially explain the cases. However, there are also cases where IT innovations under institutional pressure indeed develop capabilities. A deeper look into those cases shows that a more hands on implementations, e.g. in-house development, can significantly improve the chance of gaining capabilities. The hands on implementation can form a better basis to assimilate with the existing work life. Moreover, a more hands on approach can also increase the learning capabilities. In general, firms do not tend to derive capabilities from an existing innovation, they rather use the existing innovation as a basis to develop new innovations that can lead to capabilities. The cases findings largely support the proposed conceptual framework. However, the cases show that firms do not only learn from their acquired assets and resources, but they actually learn from all interactions, which includes perceiving institutional pressure, evoking isomorphic IT innovation, developing unique capabilities, forming sustained competitive advantages, and exerting Absorptive Capacity. This learning forms a part of the cumulative knowledge.

This study contributes to the literature by proposing a new way to synergize Institutional Theory and Resource Based View. This study argues that institutional determinants and resource determinants are not in an extreme continuum [2, 22], but they can rather happen over time with proper usage of Absorptive Capacity. Moreover, a nascent theory is proposed in to explain how IT innovations under institutional pressure can still turn heterogeneous. The findings suggest that deriving unique capabilities under institutional pressure is more prevalent on a firm level compared to an IT innovation level. This observation warrants Institutional Theory based studies to consider investigating on a firm level, as the effects may not necessarily lead to isomorphism.

This study uses case studies to develop our conceptual framework and in general case studies lack external validity and this study is no exception. The case analysis is based on a limited number of observations and only focuses on RFID. Therefore care must be taken to generalize our findings. However, this study used several methods to minimize the lack of external validity by triangulating the interviews with on-site visits and publicly available data. Furthermore, the cases tried to cover various supply chain parties and multiple respondents to further limit the bias. We used theories to guide our interviews, which goes against the traditional grounded theory building. However, this study uses cases to confirmatory validate our proposed conceptual model and therefore the guidance from the well-established theories is justified. Besides, the theories are well recognized and actually contribute to the rigor of this study.

This study is only an initial step towards developing a nascent theory. Future studies can develop a large scale confirmatory study to confirm our findings. Moreover, the findings from the cases can be used to develop measurement instruments that are specifically designed for the IS field. The findings of this study were limited to RFID. Extending the study to other IT innovations or to other problems altogether can improve the generalizability and possibly lead to other interesting findings.

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REFERENCES

[1] DiMaggio, P. J., Powell, W. W. (1983) 'The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields,' *American Sociological Review* (48:2), pp. 147-160.
[2] Deephouse, D. L. (1996) 'Does Isomorphism Legitimate?,' *Academy of Management Journal* (39:4), pp. 1024–1039.
[3] Roberts, P. W., Greenwood, R. (1997) 'Integrating Transaction Cost and Institutional Theories: Towards a Constraint-Efficiency Framework for Understanding Organizational Design Adoption,' *Academy of Management Review* (22:2), pp. 347-373.
[4] Chwelos, P., Benbasat, I., Dexter, A. S. (2001) 'Research Report: Empirical Test of an EDI Adoption Model,' *Information Systems Research* (12:3), pp. 304-321.
[5] Abrahamson, A., Rosenkopf, L. (1993) 'Institutional and Competitive Bandwagons: Using Mathematical Modeling as a Tool to Explore Innovation Diffusion,' *Academy of Management Review (*18:3), pp. 487-517.
[6] Lee, H. L., Özer, Ö. (2009) 'Unlocking the Value of RFID', *Productions and Operations Management* (16:1), pp. 40-64.
[7] Bala, H., Venkatesh, V. (2007) 'Assimilation of Interorganizational Business Process Standards,' *Information Systems Research* (18:3), pp. 340-362.
[8] Wernerfelt, B. (1984) 'The Resource-Based View of the Organization,' *Strategic Management Journal* (5:2), pp. 171–180.
[9] Amit, R., Schoemaker, P. J. H. (1983) 'Strategic Assets and Organizational Rent,' *Strategic Management Journal* (14:1), pp. 33–46.
[10] Makadok, R. (2001) 'Toward a Synthesis of the Resource-Based View and Dynamic-Capability Views of Rent Creation,' *Strategic Management Journal* (22:5), pp. 387–401.
[11] Barney, J. B. (1991) 'Organization Resources and Sustained Competitive Advantage,' *Journal of Management* (17:1), pp.99–120.
[12] Dierickx, I., Cool, K. (1989) 'Asset Stock Accumulation and Sustainability of Competitive Advantage,' *Management Science* (35:12), pp. 1504–1511.
[13] Priem, R. L., Butler, J. E. (2001) 'Is the Resource-Based Theory a Useful Perspective for Strategic Management Research?,' *Academy of Management Review* (26:1), pp. 22–40.
[14] Wade, M., Hulland, J., (2004) 'Review: Resource-Based View and Information Systems Research: Review, Extension, and Suggestions for Future Research,' *MIS Quarterly* (28:1), pp. 107-142.
[15] Santanam, R., Hartono, E. (2003) 'Issues in Linking Information Technology Capability to Organization Performance,' *MIS Quarterly* (27:1), pp. 125-153.
[16] Zhu, K. (2004) 'The Complementarity of Information Technology Infrastructure and e-Commerce Capability: A Resource-Based Assessment of Their Business Value,' *Journal of Management Information Systems* (21:1), pp. 167–202.
[17] Li, S., Shang, J., Slaughter, S. A. (2010) 'Why Do Software Organizations Fail? Capabilities, Competitive Actions, and Organization Survival in the Software Industry from 1995 to 2007,' *Information Systems Research* (21:3), pp. 631-654.
[18] Oliver, C. (1997) 'Sustainable Competitive Advantage: Combining Institutional and Resource-Based View,' *Strategic Management Journal* (18:9), pp. 697-713.
[19] Swanson, B. E., Ramiller, N. C. (2004) 'Innovating Mindfully with Information Technology,' *MIS Quarterly* (28:4), pp. 553-583.
[20] Butler, B. S. Gray, P. H. (2006) 'Reliability, Mindfulness, and Information Systems,' *MIS Quarterly* (30:2), pp. 211-224.
[21] Fichman, R. G. (2004) 'Going Beyond the Dominant Paradigm for Information Technology Innovation Research: Emerging Concepts and Methods,' *Journal of the Association for Information Systems* (5:8), pp. 314-355.
[22] Fiol, M. C., O'Conner, E. J. (2003) 'Waking Up! Mindfulness in the Face of Bandwagons,' *Academy of Management Review* (28:1), pp. 54-70.
[23] Cohen, W.M., Levinthal, D. A. (1990) 'Absorptive capacity: A New Perspective on Learning and Innovation', Administrative Science Quarterly (35:1), pp. 128-152.
[24] Lane, P. J., Koka, B. R., Pathak, S. (2006) 'The Reification of Absorptive Capacity: A Critical Review and Rejuvenation of the Construct,' *Academy of Management Review* (31:4), pp. 833-863.
[25] Lichtenthaler, U. (2009) 'Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes,' *Academy of Management Journal* (52:4), pp. 822-846.
[26] Zahra, S. A., George, G. (2002) 'Absorptive Capacity: A Review, Reconceptualization, and Extension,' *Academy of Management Review* (27:2), pp. 185-203.
[27] Roberts, N., Galluch, P. S., Dinger, M., Grover, V. (2012) 'Absorptive Capacity and Information Systems Research: Review, Synthesis, and Directions for Future Research,' *MIS Quarterly* (36:2), pp. 625-648.

[28] Leung, J., Cheung, W., Chu, S. C. (2014) 'Mindfully Aligning RFID Innovations with Supply Chain Strategies,' *Information & Management* (51:2), pp. 260-269.

[29] Eisenhardt, K. M. (1989) 'Building Theories from Case Study Research,' *Academy of Management Review* (14:4), pp. 532-550.