Introduction

Organizations are increasingly relying on both high performing internal teams as well as external entities, such as suppliers and customers, for their new product development (NPD) efforts (Sethi, Smith, and Park, 2001). Research suggests that relationship quality; a metaconstruct assessing the extent of trust, affect-based bonds, satisfaction, coordination, communication, joint problem solving, and goal congruence between internal team members and external entities - influences successful new product development (Crosby, Evans, and Cowles, 1990; Hennig-Thurau, Gwinner, and Gremler, 2002; Wong and Sohal, 2002). As a metaconstruct relationship quality provides a more nuanced view of the effects of overall relationship attributes between entities on NPD efforts, as compared to other lower-order constructs that constitute relationship quality (Crosby et al., 1990; Hennig-Thurau et al., 2002; Wong and Sohal, 2002). Although extant research highlights the importance of high quality relationships within NPD teams and with external entities, there are two key missing pieces.

The first is, although previous studies have broadly assessed the effects of relationship quality with internal and external entities on NPD, identifying the exact mechanisms through which relationship quality affects pathways for different types of innovations is underspecified in previous research. Leaving underlying mechanisms untested can result in a theoretical "blackbox" whose contents remain unknown, leading to weak theory building (Lawrence, 1997). For example, previous research suggests that higher connectedness within internal teams is beneficial to both radical and incremental innovations (Jansen, Van den Bosch, and Volberda, 2006). What is not clear is; what are the mechanisms through which team relationships affect innovation outcomes?

Furthermore, both radical and incremental innovations differ in their degree of innovativeness and are therefore likely to follow different development paths. To elaborate, radical innovations are highly revolutionary in nature, competence destroying, and induce major transformations of existing products, technologies, or services (Eisenhardt and Tabrizi, 1995; Tatikonda and Montoya-Weiss, 2001), while incremental innovations focus on refining existing firm offerings by reinforcing prevailing firm capabilities (Kline and Rosenberg, 1986; Subramaniam and Youndt, 2005). Thus radical innovations are more likely to succeed when developers receive multiple sources of information and feedback from their high quality relationships with external entities such that they recognize potential market opportunities and engage in outside-the-box thinking (Kline and Rosenberg, 1986; Subramaniam and Youndt, 2005). In contrast, incremental innovations require firm specific information related to cost minimization and improved fit to the market. Relationship quality with internal team members who have expert knowledge of their organization is likely to impact incremental innovations. However we do not know enough about the underlying theoretical mechanisms that elaborate upon how relationship quality affects innovation performance for both types of innovations.

Secondly, most previous research addressing the relationship between relationship quality and new product outcomes study either internal teams *or* external entities, but not *both.* Ours is one of the few studies to link both internal and external relationship quality with the two major innovation types. To elaborate, few studies have linked the effects of aspects of relationship quality of internal teams on new product outcomes (e.g., Brettel, Heinemann, Engelen and Neubauer, 2011; Cabrales, Medina, Lavado and Cabrera, 2008; García, Sanzo and Trespalacios, 2008; Lokshin, Gils and Bauer, 2009; Montes, Moreno and Morales, 2005; Sethi, et al., 2001; Sherman, Berkowitz and Souder, 2005; Song and Swink, 2002). For example, Sethi et al., (2001) found that social cohesion in internal teams reduced product innovativeness, although its effect was marginal. Others have explored aspects of relationship quality of NPD teams with external entities such as suppliers and customers (e.g., Enkel, Perez-Freije and Gassmann, 2005; Song and Di Benedetto, 2008; Song and Thieme, 2009). For example, Song and Thieme (2009) found that links with external entities had a greater impact on radical product performance than incremental innovations, but did not investigate internal relationships.

However, it is necessary to simultaneously analyze the impact of both types of relationship quality on both radical and incremental innovations because the two streams of literature offer different theoretical perspectives on the roots of innovation success. This is especially true given that firms depend simultaneously on both internal and external relationships when developing innovations. For example, Subramaniam and Youndt (2005) suggest that social capital - the knowledge possessed by team members that is exchanged through interactions between individuals in internal as well as external relationships - is positively related to both incremental and radical innovations. However, they do not clearly separate and test the influence of external and internal relationship quality on the varying innovation types. Understanding how relationship quality influences innovation pathways as it relates to both sets of entities can help practitioners understand which entity to focus upon when developing incremental versus radical innovations.

In this study, we use the Product Development and Management Association's (PDMA's) 2012 Comparative Performance Assessment Study (CPAS) dataset to address: How does relationship quality with internal team members and external entities influence development paths in radical versus incremental innovations and subsequent innovation performance? Our contributions lie in highlighting the process by which relationship quality in internal teams versus external entities influences innovation performance outcomes[1]. In the next section, we discuss the key process variables through which relationship quality influences innovation outcomes for both types of innovations.

Theoretical Framework

Team Relationship Quality to Process Flexibility

In general, relationship quality positively influences process flexibility through the exchange of diverse ideas between teams or individuals (Montes et al., 2005). Relationship quality is defined as the result of a set of transactions through which trust, commitment, bonding, satisfaction, and other factors are built. Thus, relationship quality is a metaconstruct that encompasses several cognitive and affective lower-order constructs (Crosby et al., 1990; Wong and Sohal, 2002).

Process flexibility makes the basicmulti assumption that NPD follows an uncertain path where technologies and markets shift rapidly; therefore, emphasizing improvisation and real time

[1] We thank our reviewers and editor for giving us these ideas on how to highlight our contributions to literature.

decision making (Eisenhardt and Tabrizi, 1995). Accelerating new products involves rapidly building flexible options to increase adaptability and subsequent development speeds, by including fluidity and fuzziness in gates, so that NPD teams can cope with changing environments (Cooper, 1994). Yet these options should provide structure through stage gates to enable teams to make sense in high uncertainty situations. Flexible NPD processes manage risks by weighing costs with benefits of collapsing gates. However, to lead to process flexibility, radical and incremental innovations necessitate high relationship quality with different sets of entities.

Radical innovations require combining new knowledge and transaction specific investments in capital (Eisenhardt and Tabrizi, 1995; Song and Thieme, 2009). Thus, firms have a tendency to increase communications from external partners to gather market intelligence and to mitigate some of their risk (Ganesan, 1994; Katz and Tushman, 1979). NPD teams with strong relationships mobilize valuable external knowledge sources by encouraging external entities to share unique knowledge and information (Maurer, Bartsch, and Eber, 2011). Thus these teams are likely to be more confident in their decisions regarding flexible gates.

H1: For radical innovations, relationship quality with external entities has a positive influence on process flexibility.

In contrast for incremental innovations, internal relationship quality is likely to be positively related to process flexibility. By definition, incremental projects tap into a firm's core capabilities (Subramaniam and Youndt, 2005), therefore internal, and not external teams play a critical role in such projects. Relationship quality within teams enhances psychological safety, a shared belief among team members that their team is safe to take risks (Edmondson, 1999). This influences process flexibility through the team's psychological safety climate by enabling team members to contribute ideas and engage in constructive problem solving (Bradley, Postlethwaite, Klotz, Hamdani, and Brown, 2012). Furthermore, internal teams with high relationship quality are generally extremely confident in their decisions and capabilities (Forsyth, 1999). Thus, teams with high relationship quality assimilate information quicker, develop better intuition, engage in constructive problem solving, and develop confidence in their decisions and capabilities.

H2: For incremental innovations, within team relationship quality has a positive influence on process flexibility.

Team Relationship Quality to Project Execution Success

Team relationship quality enables organizations to achieve project execution success for both types of innovations (Atuahene-Gima, 2003) through tacit knowledge sharing. Project execution success is the degree to which a NPD project achieves its originally-stated, central objectives such as parameters related to quality, cost, and time to market for new products (Rosenthal, 1992; Tatikonda and Rosenthal, 2000). For successfully executing radical innovations, NPD teams must bond with external partners so that it leads to the sharing of emotions, knowledge, and experiences across organizational boundaries, helping developers to meet milestones and goals for radical innovations on time (Cavusgil, Calantone, and Zhao, 2003; Song and Thieme, 2009). High quality relationships also enable NPD teams to assume that they have received reliable information thereby reducing costs for verifying knowledge resources

(Dyer and Chu, 2003). Trusting relationships with external entities enhance opportunities for knowledge transfer in less time (Inkpen and Tsang, 2005).

H3: For radical innovations, the degree of external relationship quality has a positive influence on project execution success.

For incremental innovations, internal relationship quality is an important performance driver leading to decreased production time and more accurate launch times (Clark and Fujimoto, 1991; Eisenhardt and Tabrizi, 1995). This is due to the multifunctional expertise found in quality internal relationships that allow for better integration across development tasks, reduced intervals between steps (e.g. between design and prototyping), and better identification of downstream problems (Stalk and Hout, 1990; Eisenhardt and Tabrizi, 1995). Such multifunctional collaboration enables NPD teams to effectively leveraging the organization's existing capabilities, knowledge, and processes which determines success for incremental innovations depends on (Hall and Andriani, 2003). Relationship quality within teams is crucial for such innovations because tacit knowledge about an organization's capabilities is deeply ingrained in internal teams (Ambrosini and Bowman, 2001). Internal relationship quality empowers teams to candidly share knowledge to address potential problems when analyzing their organizational capabilities in relation to market and technological possibilities (Danese and Filippini, 2010). This increases the prospects of finding effective solutions on time, resulting in project execution success (Sheremata, 2000). In sum, a team that trusts each other and works harmoniously is more likely to share their existing information and expertise that is necessary to resolve issues quickly. Thus:

H4: For incremental innovations, the degree of internal relationship quality has a positive influence on project execution success.

Process Flexibility to Project Execution Success

Process flexibility leads to improved project execution success (Ettlie and Elsenbach, 2007), which is measured by formal controls, and defined as the extent to which projects meet performance standards set by management, such as market release dates and product and quality measures for both types of innovations (Bonner, Reukert, and Walker, 2002; Clark and Fujimoto, 1991). Process flexibility enhances project execution success by reducing the effects of path dependency. Path dependencies trap NPD teams at specific gates within the process, because teams focus more on meeting gate criteria, rather than customer or market decision criteria (Jespersen, 2012). These evaluation parameters become deeply engraved over time and consequently more difficult to change with each passing stage (MacCormack, Verganti, and Iansiti, 2001). In contrast, having process flexibility enhances organizational learning by encouraging developers to incorporate new information into projects (Sethi and Iqbal, 2008). Furthermore, process flexibility empowers teams to create realistic estimates of project specifications thereby enhancing their project execution success.

H5a: Process flexibility has a positive influence on project execution success for radical innovations.

H5b: Process flexibility has a positive influence on project execution success for incremental innovations.

While process flexibility may be beneficial for both radical and incremental innovations, it is likely to be more important for radical innovations. As radical innovations involve increased uncertainty in terms of market and technology evaluations, it is more difficult to determine the costs of necessary technology and manufacturing processes upfront than for incremental innovations (Eisenhardt and Tabrizi, 1995). When the process is inflexible and strictly enforced, it is more difficult for teams to change decisions regarding these processes. For example, even if an uncertain technology that passes through initial stage gates does not bode well for the radical innovation, development teams are likely to fossilize this technology and continue to proceed with it regardless of the outcomes because it got approval in the stage gate process. Given that radical innovations require a more constant infusion of new knowledge than incremental innovations (Kline and Rosenberg, 1986), a flexible development process that integrates this new knowledge will result in better project execution success for radical innovations as compared to incremental innovations.

H5c: Process flexibility has a more positive influence on project execution success for radical innovations as compared to incremental innovations.

Process Flexibility to Market Performance

Process flexibility has a direct effect on market performance by enabling NPD teams to avoiding time consuming, costly, and redundant steps that add very little to the final product, yet impact market performance (Kahn, Barczak, Nicholas, Ledwith, and Perks, 2012). In radical innovations, which are inherently uncertain, process flexibility reduces upfront set up costs and positively influences market performance (Veryzer, 1998). For incremental innovations, given that the focus is on refining existing products, services and technologies, process flexibility allows team members to leverage their learnings from prior experiences to streamline their process by skipping or combining processes and gates as needed. This results in improved efficiency, and subsequently positive market performance (Calantone and Di Benedetto, 2000).

H6a: Process flexibility has a positive influence on market performance for radical innovations.

H6b: Process flexibility has a positive influence on market performance for incremental innovations.

Project Execution Success to Market Performance

In innovative projects, time based competition among firms has resulted in customers expecting new products to be launched more quickly than before without incurring exorbitant costs (Danese and Filippini, 2010; Kessler and Bierly, 2002; Rosenthal, 1992). However, firms have to pay for speed to market because they have to commit more personnel, materials and equipment to projects (Kessler and Bierly, 2002). Thus firms must balance reduced cycle times with costs and satisfactory technical performance as these are important predictors of innovation market performance (Calantone and Di Benedetto, 2000; Tatikonda and Rosenthal, 2000).

Timely assessments of whether the project meets project execution success measures through effective formal controls enable firms to assess deviations and take corrective measures when necessary. Optimal levels of performance control measures influence performance positively for both radical and incremental innovations (Bonner et al., 2002; Cooper, 1994). The ability of an NPD team to meet goals related to their budget, launch timeliness, and technical objectives has been found to directly influence subsequent market performance (Kleinschmidt, de Brentani, and Salomo, 2007). However, the influence of project execution success on to market outcomes does not vary across innovation types (Tatikonda and Montoya-Weiss, 2001). Thus:

H7a: Project execution success has a positive influence on market performance for radical innovations.

H7b: Project execution success has a positive influence on market performance for incremental innovations.

-- Figure 1 about here –

Methodology

Data Collection and Sample

In order to analyze our proposed model, we utilized the 2012 Comparative Performance Assessment Study (CPAS) dataset collected by the Product Development and Management Association (PDMA) (Markham and Lee, 2013). Industries varied and included capital goods, chemicals and materials, software, health care, and consumer goods. The authors removed respondents who did not complete the items utilized for construct development in this study. All respondents had partaken in varying degrees of incremental and radical product development. The final sample consisted of 240 respondents from 24 different countries. Table 1 summarizes the descriptive statistics of core variables used in the empirical analysis.

-- Table 1 about here --

Constructs

All variables used in this study were constructed using multiple self-reported measures. All items used were based on either interval level scales (e.g. Likert scales) or ratio level scales (e.g. percentage scales). The use of both interval scales and ratio scales is advantageous as it strengthens the quality of measurement and reduces the likelihood of common method variance in this study (Podsakoff and Organ, 1986). The items used for degree of internal relationship quality and external relationship quality were the same for both radical and incremental innovations. In line with the original CPAS survey, the items for process flexibility, project execution success, and market performance for radical innovations were distinct from those for incremental innovations. Therefore, two separate models were created and analyzed.

In order to assess factor structure for internal and external relationship quality, an Exploratory Factor Analysis (EFA) was run on eighteen items on five-point interval scales that focused on relationship factors, such as trust and bonding. The EFA utilized the Principal Axis Factoring extraction method with oblique Direct Oblimin rotation. In order to select our final items, we considered the scree plots, percent of variance explained by each component, and strength of factor loadings within the component matrix. The first analysis revealed that 70.6% of variance was explained by four factors. However, three items relating to the similarity between personnel appeared to be a theoretical mismatch with the other items which all related to relationship quality between personnel. Five additional items were related to relationships between co-workers across teams and did not fit our theoretical definitions of internal relationship quality (between co-workers in a team) or external relationship quality (across firms) and were consequently removed. After removing these eight items, the analysis revealed that

70.6% of the total variance was explained by two factors. Internal relationship quality could be captured using five items related to relationships between co-workers within a team ($\alpha = .867$), while external relationship quality could be constructed with five items describing the relationships between people in the respondent's firm and people in other firms ($\alpha = .916$).

Second, we followed the steps for scale purification and refinement as outlined by MacKenzie, Podsakoff, and Podsakoff (2011). This process began by running a Confirmatory Factor Analysis (CFA) that included all eighteen items loading onto one construct. As expected, we did not find satisfactory fit ($\chi 2$/df = 10.626, CFI = .496, RMSEA = .201, SRMR = .1522). Given the study's aforementioned focus, the items related to relationship quality between co-workers across teams and similarity were removed. The CFA was rerun and we were able to demonstrate satisfactory fit ($\chi 2$/df = 2.202, CFI = .971, RMSEA = .071, SRMR = .0448). In accordance with MacKenzie et al., (2011), we found that average variance extracted (AVE) was above .5, the Cronbach's alpha was above .7 for both internal relationship quality and external relationship quality, and the squared multiple correlations for each item exceeded the established threshold of .5. Thus, the items used for internal and external relationship quality are satisfactory (EFA and CFA results available upon request).

The items selected for process flexibility, project execution success, and market performance were all unique to either radical or incremental innovations. Three items on five-point scales related to skipping stages, combining or overlapping gates and conditional decisions were used to assess process flexibility. Project execution success and market performance were each constructed using three items on percentage scales. For project execution success, respondents were asked how often their projects were on time, on budget, and met technical objectives. For market performance, respondents were asked how often their projects met market objectives, were successful, and were successful in profitability. Each respondent had the opportunity to answer these questions for both incremental and radical innovations. The full list of items may be seen in Appendix A and at Markham and Lee (2013).

Results

Measurement Model Assessment

After obtaining responses and cleaning the data, structural equation modeling was used to assess the fit of both the radical and incremental innovation models. As each variable was represented by at least three items, structural equation modelling was an appropriate methodology for this study (Kline, 2010). A radical innovation model and an incremental innovation model were created to run the analysis. Both the radical innovation model (Chi-square = 230.667; df = 142; $\chi2/df = 1.624$; RMSEA = .051 (.039-.063); SRMR = .0482; NFI = .926; RFI = 910; CFI = .970; IFI = .970; TLI = .964) and the incremental innovation model (Chi-square = 254.984; df = 141; $\chi2/df = 1.808$; RMSEA = .058 (.047-.069); SRMR = .0573; NFI = .921; RFI = .905; CFI = .963; IFI = .963; TLI = .955) exhibited satisfactory fit. The AVE exceeded .5 for all variables, the Cronbach's alpha values all exceeded .7, and all item loadings approached or exceeded .7, thus supporting convergent validity and reliability (Kline, 2010). The inter-item correlations (available upon request) were higher within factors than the correlations across factors, thus satisfying the primary criteria for discriminant validity (Churchill, 1979).

Control Variables

In order to grasp a more complete picture of our results, control variables preceding market performance were added to our models. We created dummy variable's for three regions (Americas, Europe, and Asia), eight industries (media, real estate, hardware technology, transportation, energy, software technology, food and drug, and financial services), and included a five point measure for firm profit. The majority of the control variables did not produce significant results. However, we did find a small positive relationship between firms within financial services and market performance of an incremental product ($\beta = 0.071$, $p = 0.041$).

Structural Model Results

The results from the structural models were used to test our hypotheses. Within the radical innovation model, we found the degree of external relationship quality had a positive influence on process flexibility ($\beta = 0.198$, $p = 0.013$), thus providing support for H1. However, H3 was not supported as external relationship quality did not have a strong influence on project execution success ($\beta = 0.126$, $p = 0.097$). As predicted, the degree of internal relationship quality did not influence process flexibility ($\beta = 0.136$, $p = 0.097$) or project execution success ($\beta = 0.080$, $p = 0.298$) within the radical innovation model. H5a was supported as process flexibility had a positive impact on project execution success ($\beta = 0.238$, $p = 0.004$). We found that market performance was driven by project execution success ($\beta = 0.866$, $p < 0.001$) but not by process flexibility ($\beta = 0.028$, $p = 0.591$). Therefore, H6a was not supported, but H7a was not.

Interestingly, as shown in Model 1 (Table 2), process flexibility did influence market performance before project execution success was introduced to the model ($\beta = 0.298$, $p < 0.001$). This indicates that project execution success may mediate the influence of process flexibility on market performance. A bootstrapping procedure with 500 replications was used to test for a possible mediating relationship (Preacher and Hayes, 2008). It was found that the influence of process flexibility was fully mediated by project execution success and had an indirect effect on market performance (β = 0.230, $p = 0.004$).

-- Table 2 about here --

Next, we analyzed the results of the structural model for incremental innovations. As predicted, the degree of internal relationship quality had a positive influence on process flexibility (β = 0.173, $p = 0.035$) and project execution success (β = 0.152, $p = 0.049$), thus providing empirical support for H2 and H4. The degree of external relationship quality did not impact either process flexibility (β = -0.017, $p = 0.833$) or project execution success (β = 0.064, $p = 0.382$). Therefore, external relationship quality was not influential in the incremental innovation model. H5b was not supported as process flexibility did not impact project execution success (β = 0.076, $p = 0.324$). Finally, market performance of incremental innovations were found to be driven by project execution success (β = 0.902, $p < 0.001$) and process flexibility (β = 0.096, $p = 0.018$). Therefore, H6b and H7b were supported.

Although process flexibility has an influence on market performance in the final model, this influence may have been weakened from Model 1 (Table 3) to Model 2 of the incremental innovation results. To test for a potentially mediating relationship with project execution success, we ran a bootstrapping procedure with 500 replications. However, this relationship was not partially mediated by project execution success as we did not find an indirect effect between process flexibility and market performance (β = 0.026, $p = 0.729$).

-- Table 3 about here --

Group Comparison

To test for differences between the radical and incremental innovation models, we must determine that the measurement model applies across all groups while the structural model does not apply using the chi-square difference statistic (Vandenberg, 2002). In this step, we constrain the measurement weights, compare that model to the unconstrained model, and find that the chi-square difference test did not reveal a significant difference ($\Delta\chi 2$ = 16.277, p = 0.297). Thus, the measurement model is the same for both radical and incremental innovations. Next, we constrain the structural weights and compare this model to the measurement weights constrained model. According to the chi-square difference test, the difference is significant ($\Delta\chi 2$ = 161.092, p = 0.000), indicating that the structural model is not the same for both groups.

As noted above, process flexibility had a positive influence on project execution success for the radical model ($\beta = 0.249$, $p = 0.003$) but was not significant for the incremental model ($\beta = 0.032$, $p = 0.675$). In order to test this difference, a chi-square difference test was conducted in which the independent variable, process flexibility, was constrained and compared to the unconstrained model (Kline, 2010). The test revealed a significant difference in the effect of process flexibility onto project execution success ($\Delta\chi 2$ = 158.998, $p = 0.000$). Therefore, in support of H5c, process flexibility had a more positive influence on project execution success for radical innovations than for incremental innovations.

Discussion

Contributions and Implications

In this study, we introduce a process model to show how external and internal relationship quality influences development pathways in radical and incremental innovations differently. Our model attempts to clarify the "blackbox" (Lawrence, 1997) between relationship quality and new product outcomes. Despite the notable contributions of previous studies on the importance of relationship quality on innovation outcomes, previous studies have not tested underlying concepts that could explain why this relationship occurs. In this study, we strengthen theory in this field by simultaneously contrasting the development pathways between radical and incremental innovations. Furthermore, while related literature has considered the effects of internal teams or external entities, almost all firms developing new products engage with both sets of entities. Our study highlights that relationship quality with different entities activate different mechanisms for radical and incremental innovations, which in turn lead to different innovation outcomes. Our study's practical contributions provide guidance on how to structure NPD teams and collaborations when developing different types of innovations.

In line with prior literature, we show that flexible processes can lead to increased project execution success and market performance (Ettlie and Elsenbach, 2007). For radical innovations, effective flexible processes are more likely to occur when NPD teams have high quality relationship with external stakeholders. For incremental innovations, effective flexible processes are more likely to occur when NPD teams have high relationships with internal teams. While process flexibility and project execution success achieved through internal relationship quality are important in determining market performance for incremental innovations, for radical innovations, process flexibility through external relationship quality is an important driver of project execution success.

Our findings highlight the belief that external collaborations are necessary for the successful development of radical innovations (Cavusgil et al., 2003; Song and Thieme, 2009). We extend this line of literature by arguing that internal relationship quality has no impact on the success of radical innovations and should be deemphasized in favor of external relationship quality. Based on these findings, we recommend that developers of radical innovations create close connections with their suppliers and customers throughout the development process through focus groups and other crowdsourcing methods, to access their unique take on product ideas, product designs, and market needs that internal developers may not have.

Conversely, internal relationship quality plays a significant role in the success of incremental innovations while external relationship quality is essentially rendered meaningless. Internal relationship quality had a direct impact on both process flexibility and project execution success, both of which impact market performance. These findings align with prior literature that has found that internal teams that collaborate with each other are better equipped to leverage their organization's core capabilities through sharing of tacit knowledge (du Plessis, 2007). Launch timeliness is likely to be more important for incremental products (Clark and Fujimoto, 1991; Eisenhardt and Tabrizi, 1995). Therefore for incremental innovations, developers must create tightly knit, internal teams and avoid too much collaboration with outside partners, as this is likely to slow down product development times and increase development costs.

Another interesting contrast we found is that for radical innovations, external relationship quality impacts project execution success only through process flexibility. Consequently, project execution success drives market performance. For incremental innovations, degree of internal relationship quality affects project execution success directly and not through process flexibility. One of the reasons for this contrast could be that a focus on external relationship quality essentially necessitates a more flexible development process. Firms that are focused on integrating external ideas will be utilizing more knowledge sources in their NPD process than firms focused on only internal ideas (Eisenhardt and Tabrizi, 1995). Further, these external knowledge sources will not be familiar with any internal development processes and might not provide timely information. Therefore, to truly integrate these external ideas, the developers must embrace a flexible process, that adjusts dynamically as the ideas present themselves.

For incremental innovations, internal relationship quality did not lead to project execution success through process flexibility. We surmise that internal relationship quality leads to project execution metrics success not through process flexibility but through process formality. Formal processes influence the success of incremental innovations by enabling a firm to launch products on time and to meet budgetary and technical goals (Salomo, Weise, and Gemünden, 2007; Tatikonda and Montoya-Weiss, 2001). It is possible that internal relationship quality helps NPD teams meet project formality measures such as meeting gate criteria on time. Interestingly, process flexibility did have a direct influence on market performance. This might occur because while flexible processes do not help with project execution success for incremental innovations, these processes might enable NPD teams to create incremental products that are ultimately more differentiated and attractive to the market. Thus, while development efficiency is likely the major driver of incremental product success, NPD teams should include small amounts of process flexibility into their incremental projects.

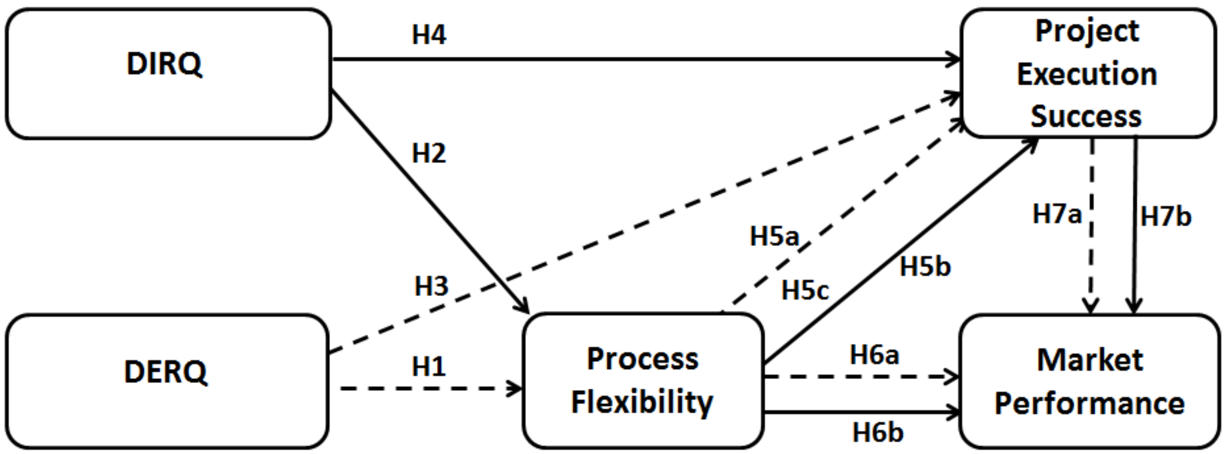
Limitations, Future Research and Conclusions

One key limitation of our study is that responses collected were subjective and self-reported. Although subjective responses were necessary to address our research question, inclusion of objective measures, especially for the market performance measures and project level data, would have added an extra degree of confidence to our findings. Thus, future research should consider multiple sources of data. Furthermore, the scales were developed by a separate set of researchers, thus limiting our ability to check the validity of each scale.

Future studies must consider using process explanations in conjunction with variance explanations to strengthen the theoretical bases of NPD literature. Most traditional research in this area provides variance explanations instead of process explanations (Mohr, 1982). For example, research suggests that integrating suppliers into the NPD process leads to project team effectiveness and resulting performance (Petersen, Handfield, and Ragatz, 2005). Including other organizational variables, such as hierarchical power and resource control, could alter the influence of external and internal relationship quality. For example, internal relationship quality may be more influential in flatter or smaller organizations. Furthermore, we utilized the pre-existing CPAS data set in this study; a strong follow-up study could test not only the generalizability of the scales, but also aim to expand upon them by using psychometric measures. Finally, we hope that our study will strengthen extant research on the influence of teams on NPD outcomes. We hope to have broadened the process based avenues for exploring the nuances of the effects of high quality team relationships on new product development processes with this study.

Figures and Tables

Figure 1: Conceptual Model



Note: - - -> = Radical Innovations; ——> = Incremental Innovations

Table 1. Descriptive Statistics and Correlation

	1	2	3	4	5	6	7	Mean	St. Dev.
1. Degree of Internal Relationship Quality								3.579	.649
2. Degree of External Relationship Quality	.287**							3.011	.798
3. Process Flexibility_Radical	.157*	.233**						2.446	1.057
4. Process Flexibility_Incremental	.174**	.173**	.005					2.783	1.104
5. Project Execution Success_Radical	.162*	.193**	.234**	.005				37.842	26.486
6. Project Execution Success_Incremental	.058	.025	-.119	.086	.016			63.228	27.317
7. Market Performance_Radical	.126	.145*	.251**	-.059	.764**	-.065		44.140	30.344
8. Market Performance_Incremental	.035	.030	-.145*	.159*	-.052	.820**	-.143*	65.151	26.993

Note: **. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed). N=240.

Table 2. Results of Structural Model - Radical Innovation Model

	Model 1	Model 2

Independent Variable	Dependent Variable	Estimate	S.E.	Estimate	S.E.
Degree of Internal Relationship Quality	Process Flexibility	0.136	0.115	0.136	0.114
Degree of External Relationship Quality		0.212**	0.085	0.198**	0.084
Degree of Internal Relationship Quality	Project Execution Success	--	--	0.080	2.722
Degree of External Relationship Quality		--	--	0.126	2.029
Process Flexibility		--	--	0.238**	2.112
Process Flexibility	Market Performance	0.298***	2.452	0.028	1.772
Project Execution Success		--	--	0.866***	0.087

Note: Standardized Regression Weights. ** $p < .05$, *** $p < .001$

Table 3. Results of Structural Model - Incremental Innovation Model

		Model 1		Model 2	
Independent Variable	Dependent Variable	Estimate	S.E.	Estimate	S.E.
Degree of Internal Relationship Quality	Process Flexibility	0.182**	2.204	0.173**	0.126
Degree of External Relationship Quality		-0.014	-0.175	-0.017	0.091
Degree of Internal Relationship Quality	Project Execution Success	--	--	0.152**	2.899
Degree of External Relationship Quality		--	--	0.064	2.082
Process Flexibility		--	--	0.076	1.884
Process Flexibility	Market Performance	0.172**	2.422	0.096**	1.117
Project Execution Success		--	--	0.902***	0.063

Note: Standardized Regression Weights. ** $p < .05$, *** $p < .001$

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Appendix A - Survey

Construct	Item
Degree of Internal Relationship Quality (DIRQ): Think about product development personnel associated with your Business Unit. Describe the relationships between co-workers within teams.	
DIRQ1	They have a bond with each other.
DIRQ2	They are satisfied with each other.
DIRQ3	They trust each other.
DIRQ4	They like each other.
DIRQ5	They work harmoniously together.
Degree of External Relationship Quality (DERQ): Think about product development personnel associated with your Business Unit. Describe the relationships with your people and people in other firms.	
DERQ1	They have a bond with each other.
DERQ2	They are satisfied with each other.
DERQ3	They trust each other.
DERQ4	They like each other.
DERQ5	They work harmoniously together.
Process Flexibility (PF): Which of the following are part of your formally documented process?	
PF1	We are prepared to skip stages or combine gates based on carefully selected criteria.
PF2	We have overlapping gates based on carefully selected criteria.
PF3	In addition to go/ no go decisions at gates, we have conditional decisions for which the conditions are specifically stated.
Project Execution Success (PES): Based upon your Business Unit's definition of a successful new product, about what % of all new products introduced into the market during the last five years were successful?	

PES1	% on time
PES2	% on budget
PES3	% met technical objectives
Market Performance (FP): What percentage of products would you estimate were successful in terms of their profitability to the Business Unit?	
MP1	% met market objectives
MP2	% successful
MP3	% successful in profitability

Notes: DIRQ, DERQ, and PF measured on five point interval scale: never, about 25% of the time, about 50% of the time, about 75% of the time, virtually always. PP and MP measured on percentage scale. Separate answers were provided for radical and incremental innovations for PF, PP, and MP