

Global Conference on Business and Social Science-2014, GCBSS-2014, 15th & 16th December,  
Kuala Lumpur

## Organisational capabilities, environmental turbulence, and NPD performance: a study on Malaysian manufacturing firms

Mohamad Faizal Ahmad Zaidi<sup>a,\*</sup>, Siti Norezam Othman<sup>b</sup>

<sup>a,b</sup>*School of Technology Management and Logistics, Universiti Utara Malaysia, Sintok, Kedah Darul Aman, 06010, Malaysia*

---

### Abstract

Although current NPD study is focusing on various organisational capabilities, the amount of studies that have looked at the relationships between them and NPD performance under turbulence environments remains relatively low in the context of the Malaysian manufacturing sector. The results have revealed that different organisational capabilities have different effects on different NPD performances under various environmental turbulences. From DCs point of view, this study has proven that, unless firms are capable of deploying the correct types of organisational capabilities, simply possessing them is insufficient to achieve better NPD performance under a turbulence environment.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of GLTR International Sdn. Berhad.

*Keywords:* Dynamic capabilities; environmental turbulence; Malaysian manufacturing firms; NPD performance; organisational capabilities

---

### 1. Introduction

This study aims to investigate the interrelationships among organisational capabilities, environmental turbulence and NPD performance, as they are rarely studied together in the existing literature. This study is relevant to be conducted in terms of the Malaysian manufacturing sector, since “there has been no study conducted on how manufacturing firms in Malaysia develop [or deploy] their [organisational] capabilities and resources in pursuit for better [NPD] performance and competitive advantage” (Ramayah, Sulaiman, Jantan, and Ching, 2004, p. 2). Addressing this issue is crucial, since NPD performance of Malaysian firms is lower than multinational firms, which may affect their adaptation to change under environmental turbulence for achieving competitive advantage (Kowang,

---

\* Corresponding author. Tel.: +60-4928-7024; fax: +60-4928-7070.  
E-mail address: [mdfaizal@uum.edu.my](mailto:mdfaizal@uum.edu.my)

Rasli, and Long, 2014). In addition, although NPD practices of manufacturing firms in Malaysia were no different from those of global firms, they are at the infancy level, and still growing (Jabar, Soosay, and Santa, 2011). Consequently, organisational capabilities of manufacturing firms in Malaysia are not very complicated (Bauly, 2004), and deserve further analysis.

## **2. Issues and research question**

Since firms manage NPD in a portfolio that allows NPD processes to be implemented simultaneously within multiple NPD projects, they “recognise that every development project is an investment, and just like the stock market portfolio, the mix and balance of these new product project investments must be carefully scrutinised” (Cooper, 2005, p. 7). However, as NPD is a complex and challenging effort with high rates of failure, it was found that NPD performance is affected by uncertainty of market and technological turbulences (Cao, Zhao, and Nagahira, 2011). The dynamic effects of environmental turbulence on the deployment of organisational capabilities and NPD performance is critical because “NPD is a system encompassing the dynamic interaction between internal and external factors, [where a] delay in action for a firm possessing distinctive competencies may inhibit success” (Harmancioglu, McNally, Calantone, and Durmusoglu, 2007, p. 421). As there is no single strategy that fits for all conditions, depending on various factors, firms should deploy relevant tools of innovation (e.g., exploitation capability) to ensure successful NPD projects (Islam, Doshi, Mahtab, and Ahmad, 2009). Nevertheless, the relationships between organisational capabilities and environmental turbulence are still rarely investigated in NPD (Page and Schirr, 2008). As such, the objective of this study is to answer the question: what are the relevant types of organisational capabilities to be deployed to achieve better NPD performance under environmental turbulence?

## **3. Literature review and hypothesis building**

For the purpose of answering the research question, the concepts of NPD performance, organisational capabilities, and environmental turbulence are discussed. Firstly, there are two dimensions of NPD performance, namely, business performance that relates to exploitative NPD, and knowledge performance that relates to explorative NPD (Ahn, Lee, and Lee, 2006). Since NPD performance is not only limited to efficiency and effectiveness, but also on the integration between them (Carbonara and Scozzi, 2006), it was found that NPD performance is related to both financial and nonfinancial criteria (Ittner, Larcker, and Randall, 2003). Since different capabilities may have varying effects on various performances (Krasnikov and Jayachandran, 2008), this study adopted both criteria for measuring NPD performance. Secondly, since the early works of Levitt and March (1988), the distinctions (trade-offs) between exploitation and exploration capabilities (two types of organisational capability) have been covered exhaustively in management literature (He and Wong, 2004). From NPD perspective, both capabilities are important because different types of new products are generated by investing in different capabilities (Molina-Castillo, Jimenez-Jimenez, and Munuera-Aleman, 2011). Hence, exploitation and exploration capabilities that were treated as equally important should be further investigated.

Meanwhile, scholars’ interest in the concept of organisational ambidexterity is increasing (Raisch, Birkinshaw, Probst, and Tushman, 2009) due to the management of multiple projects, which require firms to build and implement specific organisational capabilities with skills that are not easily acquired (Nobeoka and Cusumano, 1997). With organisational ambidexterity, firms are able to renew competencies by introducing breakthrough products without destroying existing ones (O’Reilly and Tushman, 2004). Generally, there are two different meanings of ambidexterity, where the one that exists in the structure is referred to as structural ambidexterity, while the one that lies in behavioural orientation is referred to as contextual ambidexterity (Luzon and Pasola, 2011). Since structural and contextual ambidexterity (also two types of organisational capability) are complementary in nature (Gibson and Birkinshaw, 2004), this study treats both as equally important. Accordingly, the environment can be considered as turbulent when it is dynamic, heterogeneous and hostile, and when the change is frequent and dramatic, prediction is less accurate, and response is less timely (Droge, Calantone, and Harmancioglu, 2008). In fact, changes in business practices, population, public policies, increasing number of mergers, acquisitions, and strategic alliances in various industries, globalisation, and the presence of more rapid and radical development of technology, which are the characteristics of 1990s, are still characterising the current business environment, but at a greatly higher intensity. Since changes in

NPD are caused by rapidly changing markets and technologies, and intensity of competition, it was found that market turbulence, technological turbulence, and competitive intensity were recognised as the main sources of environmental turbulence (Droge, Calantone, and Harmancioglu, 2008).

When the interrelated issues of NPD performance and organisational capabilities (i.e., exploitation capability, exploration capability, structural ambidexterity and contextual ambidexterity) are to be addressed under environmental turbulence, they should be best viewed with DCs concept (Barreto, 2010), which is conceptualised as a firm's ability to deploy organisational capabilities under environmental turbulence to achieve better NPD performance. Hence, it was hypothesised that the strengths and directions of the relationship for each type of organisational capability and NPD performance are significantly moderated by different types of environmental turbulence. For this study, exploitation capability refers to the firm's ability to exploit existing products with current knowledge in NPD projects; exploration capability refers to the firm's ability to explore new product opportunities with new knowledge; structural ambidexterity refers to the firm's ability to create separate structures for simultaneously exploiting and exploring new products; and contextual ambidexterity refers to the firm's ability to effectively manage and divide time and shift backward and forward between exploitation and exploration of NPDs.

#### **4. Research methodology and data handling**

This study targeted NPD-related managers from Malaysian manufacturing firms at the firm-level of analysis. The questionnaire was constructed from established studies with 58 items in four sections, namely, NPD performance, organisational capabilities, environmental turbulence and firm profile, respectively. Prior to analysis, the questionnaire was face validated by three experts, and reliability was pre-tested on 30 responses. With no major problems detected, the questionnaire was updated and distributed via post services to 700 respondents that were randomly selected from the Federation of Malaysian Manufacturing Directory. All analyses were performed with SPSS Version 19 statistical technique. The usable response rate for this study was 17.6%. By comparing between early and late response groups, the Independent-Samples Mann-Whitney U Test has shown the significance values of all variables exceeded 0.05, suggesting that the nonresponse bias does not exist. This study was responded by 78.3% of respondents with experiences of at least six years in the business. A total of 69.4% of respondents were product/production managers, while others, such as R&D managers, are still relevant to this study. A total of 82.8% of respondents were from manufacturing firms that were established for at least 11 years. This study was dominated by SMEs, with employees between 1 and 150 (60.7%). One thirds of the responses came from electrical and electronics (16.4%), petrochemical and polymer (14.8%) and food processing (12.3%) industries. A total of 76.2% of responses were involved in the extension of existing product lines, 70.5% for additional product lines, 38.5% for the "me-too-products", and 39.3% for true/radical product innovation. Meanwhile, 10 cases were removed after eye-balling of outliers. The normality of the data distribution was tested with the Shapiro-Wilk test, with all values ranging between 0.052 and 0.323. As the values exceeded the significance level of 0.05, they were all approximately normal. Construct validity was performed with principal component analysis. Prior to this analysis, all issues, such as sample size, outliers, correlation, and sampling adequacy, were dealt with. By inspecting the outputs of factor analysis, this study had resulted in the removal of two items from NPD performance, six items from environmental turbulence, and none from organisational capabilities. For a reliability test, the internal consistency with Cronbach's coefficient alpha was applied, which indicated the correlation of all items in the related scale. With the coefficient alpha of all variables (0.736 to 0.93) higher than the acceptable level of 0.7, the reliability was assured.

#### **5. Results interpretation**

Hierarchical multiple regression analysis was used to examine the moderating effect of environmental turbulence in the relationships between organisational capabilities and NPD performance. By using SPSS Version 19 statistical technique, all related variables were included in order within three models: Model 1 for organisational capabilities, Model 2 for environmental turbulence, and Model 3 for interactions between organisational capabilities and environmental turbulence. After considering the multivariate assumptions, the analysis performed according to the hypothesis. Prior to analysis, the results of correlation analysis were inspected. The correlation analysis has shown

that all bivariate relationships between organisational capabilities and NPD performance that ranged from 0.117 to 0.551 at  $p < 0.1$  were positive and significantly correlated. This implies that hierarchical regression analysis can be performed. Accordingly, the results of  $F$  Change were also inspected to identify the contribution of Model 3 (moderation effects) in the investigated relationships. The moderation effects of market turbulence (5.889), technological turbulence (2.103), and competitive intensity (2.455) were significant in the relationships between organizational capabilities and NPD financial performance at  $p < 0.1$ . This suggests all three types of environmental turbulence were able to explain additional variances in the NPD financial performance. However, the  $F$  Change was not significant towards NPD nonfinancial (innovativeness and quality) performance, which means Model 3, to explain the moderation effects of environmental turbulence in the relationships between organizational capabilities and NPD nonfinancial performance, did not exist. Fortunately, the ANOVA analyses have suggested some of the relationships between certain types of organizational capabilities and NPD nonfinancial performance were moderated by specific types of environmental turbulence<sup>†</sup>.

By inspecting the Coefficient Table, the results suggested that all the statistically significant relationships between exploitation capability and NPD performance were negative when moderated by high-level environmental turbulence. Precisely speaking, exploitation capability was negatively related to NPD financial performance (-.220) under high-level market turbulence, and also negatively related to NPD innovativeness (-.218) and quality performance (-.193) under high-level competitive intensity. These results were consistent with a previous study that has shown customer orientation (exploitation-related) was less effective under uncertainty of demand (market turbulence; Zhou and Li, 2010). This finding is also in line with a recent study that has shown that strengthening the exploitation capability was deemed unsuitable under high-level environmental turbulence (Molina-Castillo, Jimenez-Jimenez, and Munuera-Aleman, 2011). By rights, the all-negative moderating effects confirmed that excessive use of exploitation capability will turn into a competency trap I (Liu, 2006). However, from a different point of view, the results have indicated that the use of exploitation capability was relevant to an increase in NPD performance under low-level market turbulence and competitive intensity. These results were in support of a previous study that has found market orientation (e.g., exploitation-related) was more suitable to be used under less turbulent environments (Calantone, Garcia, and Droge, 2003). In contrast, results on the moderating effects of environmental turbulence between exploration capability and NPD performance have shown both positive and negative effects existed in the related relationships. Specifically, exploration capability was positively related to NPD financial performance when moderated by high-level market turbulence (.273) and competitive intensity (.257), but negatively related under high-level technological turbulence (-.344). The positive moderating effects of high-level market turbulence and competitive intensity on exploration capability were consistent with a previous study that claimed: “environmental turbulence and competitive intensity had the greatest positive impact on radical [exploration] innovation” (Tinoco, 2009, p. 7). Meanwhile, the negative effect of technological turbulence between exploration capability and NPD financial performance was a result of excessive exploration (Liu, 2006) that has caused the NPD projects to become less relevant. This implies pushing exploration capability to the limit negatively affects performance (He and Wong, 2004).

Meanwhile, results have also shown that all of the statistically supported moderating effects of environmental turbulence in the relationships between structural ambidexterity and NPD performance were positive. In more detail, a positive moderating effect exists in the relationships between structural ambidexterity and NPD financial performance under high-level market turbulence (.408) and technological turbulence (.232), and in the relationship between structural ambidexterity and NPD innovativeness (.201), and quality performance (.218), under high-level technological turbulence. These positive results were consistent with a previous study that has urged firms not to become stuck with the same structure, and that they should apply structural ambidexterity to achieve better NPD performance, as the correct structure is needed for the correct NPD process (Visser, *et. al.*, 2010). This study confirmed that “the simultaneous success in exploration and exploitation require firms to separate these initiatives into different units” (Aloini, Martini, and Neirotti, 2012, p. 30). This study was also in support of a previous study that has found that sustainability in financial performance was achieved with a balance in technological portfolio that “allows an enterprise to offset the obsolescence of its existing technological paradigms [exploit] through disruption or saturation

---

<sup>†</sup> Due to limited number of pages, the SPSS outputs were purposely omitted from this paper. Please contact the Author for the data, if necessary.

with new technological paradigms [explore]” (Shamshurin, 2011, p. 8-70). In contrast, a finding on the moderated relationships between contextual ambidexterity and NPD performance has shown that only one hypothesis was supported, which is between contextual ambidexterity and NPD financial performance under high-level market turbulence, and has a negative effect (-.303). The negative effect may possibly occur because simultaneous pursuit of exploitation and exploration of new products was not achieved within the contextual attributes, which end up creating and elevating the trade-off among themselves (Gibson and Birkinshaw, 2004). Based on this result, it was found that contextual ambidexterity was a less important type of organisational capability to be considered under environmental turbulence, which explained the reason for it being neglected in the existing literature (Schudy, 2010). Another reason for this is that, although contextual ambidexterity is easy to imagine to work under a given setting, “it is harder to see how it would permit a company to adjust to disruptive or discontinuous changes in technologies and markets” (O’Reilly and Tushman, 2013, p. 12).

## 6. Discussion of findings

This study concludes that manufacturing firms in Malaysia place more emphasis on market turbulence. Since market turbulence is the most frequently to occur, it was found to moderate NPD financial performance, such as during the previous economic recession. On the other hand, competitive intensity, which is less emphasised by firms, should not be taken for granted, since hypotheses testing have found that this turbulence moderates all types of NPD performance compared to market turbulence, which only moderates NPD financial performance. Since NPD nonfinancial performance is a foundation to create future financial performance, Malaysian manufacturing firms are advised to balance their NPD projects according to the types of environmental turbulence for the benefits of their own future. Meanwhile, this study also revealed that structural ambidexterity is the most valued type of organisational capability by manufacturing firms in Malaysia. This shows that, although the majority of firms were SMEs (60.7%) where most of the NPD projects are incremental (82.5%), they preferred to use different structures for different NPD projects rather than focus on similar structures for different projects. As such, these firms have NPD portfolios consisting of various projects assigned to different units. The ability of these SMEs to deploy structural ambidexterity shows that small firms are agile and flexible in managing NPDs.

In a wider perspective, this study has answered the NPD issues as follows. Firstly, when comparing between exploitation and exploration capabilities under environmental turbulence, this study has shown that effective environments for exploitation capability were dissimilar from exploration capability. For instance, exploitation capability was negatively moderated by market turbulence and competitive intensity, but the same type of environmental turbulence was positively moderated by exploration capability. This means that the trade-off between them can be managed or even avoided, since the best timing to deploy each of them varies. Secondly, regardless of the types of environmental turbulence, structural ambidexterity was observed to be the most moderated type of organisational capability, in which all of the moderation effects were positive. This means that structural ambidexterity performs better than others under environmental turbulence. Thirdly, contextual ambidexterity was observed to be the less moderated type of organisational capability. It was only moderated once by market turbulence to NPD financial performance, and produced a negative effect. In contrast, all of the existing moderating effects of environmental turbulence between structural ambidexterity and NPD performance were positive. As these results suggest, contextual ambidexterity and structural ambidexterity were found not to complement each other. This shows that organisational ambidexterity also has limitation of use. Fourthly, when comparing among different types of environmental turbulence, it appeared that market turbulence has moderated all types of organisational capabilities, but only in the relationships with NPD financial performance. In contrast, technological turbulence and competitive intensity have moderated certain types of organisational capabilities, but the effects were wide-spreading across all types of NPD performance. Meanwhile, it was also found that competitive intensity was the less critical type of environmental turbulence. This means that different types of environmental turbulence have different moderating effects in the relationships between organisational capabilities and NPD performance. Fifthly, when addressing the moderating effects of environmental turbulence with the DCs concept, the findings have shown that different types of organisational capabilities have dissimilar effects on same type of NPD performance when moderated by similar types of environment turbulence. These findings suggest that the correct types of organisational capabilities should be

deployed under the correct types of environmental turbulence to achieve better NPD performance. This implies that firms that have the ability to deploy organisational capabilities under environmental turbulence indeed possess DCs.

## 7. Contributions of the study

Most DCs studies only highlight environmental turbulence, either in general, or according to specific types of change, such as rapidly changing technologies (Zaidi and Othman, 2014). However, other types of environmental turbulence, such as competitive intensity, are also critical and need to be responded to by firms. At the same time, while DCs are originally designed to respond to rapidly changing environments (Teece, 2007), some scholars have argued that DCs can also be used under stable environments (Eisenhardt and Martin, 2000). Others have even claimed that DCs are not necessarily related to environmental conditions (Zahra, Sapienza, and Davidsson, 2006). As such, this study has left major implication to the concept of DCs by clarifying and detailing the types and levels of environmental turbulence (i.e., market turbulence, technological turbulence and competitive intensity) to be responded. Secondly, although research in NPD is heading toward maturity, where most of the issues addressed in literature have been touched upon (Page and Schirr, 2008), it does not necessarily mean the field is stagnant. Instead, the field should consider new research streams for NPD performance (Chakravarthy, 1997). Since the level of knowledge needs to be improved through the re-evaluating of previous approaches in NPD for a more systematic research agenda (Craig and Hart, 1992), this study has contributed to new and current knowledge on NPD by promoting the issue of building and sustaining NPD performance under environmental change. The challenges of maintaining NPD performance are further elevated when the product lifecycle becomes shorter, when new products substitute existing ones, and when meeting consumer needs becomes difficult. Therefore, by stressing on the influences of environmental turbulence on NPD performance, it gives implication and clarification on the types of organisational capabilities to be pursued under different types and levels of environmental turbulence in order to achieve better NPD performance. Thirdly, the results should be able to signal top management or decision-makers in avoiding two types of errors in NPD projects, which are: (1) the potential failure of a project that proceeded because managers have ignored the risk signals, and (2) the potential success of a project that is prematurely terminated because of scarce evidences for its success (Bonabeau, Bodick, and Armstrong, 2008). For these reasons, since strategic choice is made by top management and affects the overall strategic planning, the results are valuable for the decision making process, which help firms to become flexible and agile manufacturers of new products.

## 8. Limitations of the study

Although more than 100 samples were received during a six months period of data collection, further efforts to increase the response rate were limited by time and costs. Also, even though the findings were able to recommend a deployment strategy for organisational capabilities to achieve greater NPD performance under environmental turbulence, it is not inclusive of all. For instance, there is no deployment strategy under market turbulence that can be recommended to achieve better NPD nonfinancial performance. Thus, there could be better types of organisational capabilities to be deployed to achieve NPD nonfinancial performance under market turbulence, but they have not been investigated in this study. Furthermore, this study used  $p < 0.1$  as the minimum acceptable significance level, because: “with all things being equal, standard errors will be larger in smaller data sets, so it may make sense to choose 0.1 [as significance level] in a smaller data set” (Noymer, 2008, p.18). As such, the results in this study must be interpreted with care.

## 9. Recommendations for future study

It is recommended that future studies focus on the specific types of industries where the similarities and dissimilarities in the deployment strategy of organisational capabilities can be meaningfully identified. This occurs because the same capability that is at the explorative level of one firm could be at the exploitative level of another firm (He and Wong, 2004), which means the levels of organisational capabilities may not be treated as absolute (Winter, 2003). Also, the research findings has shown that Malaysian manufacturing firms are more oriented toward exploitation capability (e.g., incremental NPD projects), and market turbulence (e.g., changing customers’

preferences) has more influence on NPD financial performance. Since they are not the only factors that have affected NPD, future research should consider investigating the forces that drive Malaysian manufacturing firms to place more emphasis on incremental NPD projects, NPD financial performance and market turbulence. Furthermore, while previous studies had shown that contextual ambidexterity is an intermediate output to structural ambidexterity (Aloini, Martini, and Neirotti, 2012), this study has shown different results, where contextual ambidexterity is negatively related to NPD financial performance under high-level market turbulence, in contrast to the result of structural ambidexterity. Since the inconsistency of previous results suggest that the literature of contextual ambidexterity is at the infancy level (Venkatraman, Lee, and Iyer, 2007), future studies should do more empirical research on contextual ambidexterity to enhance understanding on this capability. Future studies should also expand this study on other aspects of NPD besides performance itself. The findings of this study are not inclusive, as there is no deployment strategy that can be recommended for NPD nonfinancial performance under market turbulence. As such, future studies should include other types of organisational capabilities (which are not addressed here) to be deployed to achieve greater NPD performance under specific types of environmental turbulence.

## 10. Conclusion

This study has answered the research question by offering possible types of organisational capabilities to be deployed under certain types and levels of environmental turbulence in order to achieve the specific types of NPD performance. As a result, this study has come to the conclusion that, even though all capabilities are imperative to NPD performance under different environmental conditions, firms must select the appropriate capabilities for the correct environments. In other words, firms that are capable of deploying the correct capability for NPD projects in response to environmental turbulence will achieve better NPD performance.

## Acknowledgements

The authors acknowledged the School of Technology Management and Logistics for funding this research paper for conference and publication, and the Othman Yeop Abdullah Graduate School of Business, College of Business, Universiti Utara Malaysia for providing a platform and supporting the survey.

## References

- Ahn, J.-H., Lee, D.-J., and Lee, S.-Y. (2006). Balancing Business Performance and Knowledge Performance of New Product Development: Lessons from ITS Industry. *Long Range Planning*, 39, 525-542.
- Aloini, D., Martini, A., and Neirotti, P. (2012). Unpack It: Organisational Ambidexterity between Structure, Knowledge and Performance. An empirical analysis.
- Barreto, I. (2010). Dynamic Capabilities: A Review of Past Research and an Agenda for the Future. *Journal of Management*, 36(1), 256-280.
- Baully, J. A. (2004). *NPD in Manufacturing Companies - Use of Surveys to Determine Overall Status in a Country or Region, and Changes over Time*. Paper presented at the International Engineering Management Conference 2004.
- Bonabeau, E., Bodick, N., and Armstrong, R. W. (2008). A More Rational Approach to New-Product Development. *HBR*, 96-102.
- Calantone, R., Garcia, R., and Droge, C. (2003). The Effects of Environmental Turbulence on New Product Development Strategy Planning. *Journal of Product Innovation Management*, 20, 90-103.
- Cao, Y., Zhao, L., and Nagahira, A. (2011). The Impact of Front End Innovation in New Product Development in Japanese Manufacturing Companies. *Nankai Business Review*, 2(1), 98-113.
- Carbonara, N., and Scozzi, B. (2006). Cognitive Maps to Analyse New Product Development Processes: A Case Study. *Technovation*, 26, 1233-1243.
- Chakravarthy, B. (1997). A New Strategy Framework for Coping with Turbulence. *Sloan Management Review*, 69-82.
- Cooper, R. G. (2005). Attention: Results are Down! Your NPD Portfolio may be Harmful to your Business's Health. *PMDA Visions*, XXIX(2), 3-13.
- Craig, A., and Hart, S. (1992). Where to Now in New Product Development Research? *European Journal of Marketing*, 26(11), 2-49.
- Droge, C., Calantone, R., and Harmancioglu, N. (2008). New Product Success: Is it Really Controllable by Managers in Highly Turbulent Environments? *Journal of Product Innovation Management*, 25, 272-286.
- Eisenhardt, K. M., and Martin, J. A. (2000). Dynamic Capabilities: What are They? *Strategic Management Journal*, 21, 1105-1121.
- Gibson, C. B., and Birkinshaw, J. (2004). The Antecedents, Consequences, and Mediating Role of Organisational Ambidexterity. *The Academy of Management Journal*, 47(2), 209-226.

- Harmancioglu, N., McNally, R. C., Calantone, R. J., and Durmusoglu, S. S. (2007). Your New Product Development (NPD) is only as good as Your Process: An Exploratory Analysis of New NPD Process Design and Implementation. *RandD Management*, 37(5), 399-424.
- He, Z.-L., and Wong, P.-K. (2004). Exploration vs. Exploitation: An Empirical Test of the Ambidexterity Hypothesis. *Organisation Science*, 15(4), 481-494.
- Islam, M. Z., Doshi, J. A., Mahtab, H., and Ahmad, Z. A. (2009). Team Learning, Top Management Support and New Product Development Success. *International Journal of Managing Projects in Business*, 2(2), 238-260.
- Ittner, C. D., Larcker, D. F., and Randall, T. (2003). Performance Implications of Strategic Performance Measurement in Financial Services Firms. *Accounting, Organisations and Society*, 28, 715-741.
- Jabar, J., Soosay, C., and Santa, R. (2011). Organisational Learning as an Antecedent of Technology Transfer and New Product Development: A Study of Manufacturing Firms in Malaysia. *Journal of Manufacturing Technology Management*, 22(1), 25-45.
- Kowang, T. O., Rasli, A., and Long, C. S. (2014). New Product Development in Malaysia: Does Organisational Background Really Matter? *Jurnal Teknologi*, 68(3).
- Krasnikov, A., and Jayachandran, S. (2008). The Relative Impact of Marketing, Research-and-Development, and Operations Capabilities on Firm Performance. *Journal of Marketing*, 72, 1-11.
- Levitt, B., and March, J. G. (1988). Organisational Learning. *Annual Review of Sociology*, 14, 319-340.
- Liu, W. (2006). Knowledge Exploitation, Knowledge Exploration, and Competency Trap. *Knowledge and Process Management*, 13(3), 144-161.
- Luzon, M. D. M., and Pasola, J. V. (2011). Ambidexterity and Total Quality Management: Towards a Research Agenda. *Management Decision*, 49(6), 927-947.
- Molina-Castillo, F.-J., Jimenez-Jimenez, D., and Munuera-Aleman, J.-L. (2011). Product Competence Exploitation and Exploration Strategies: The Impact on New Product Performance through Quality and Innovativeness. *Industrial Marketing Management*.
- Nelson, R. R., and Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge: Harvard University Press.
- Nobeoka, K., and Cusumano, M. A. (1997). Multiproject Strategy and Sales Growth: The Benefits of Rapid Design Transfer in New Product Development. *Strategic Management Journal*, 18(3), 169-186.
- Noymer, A. (2008). Alpha, Significance Level of Test. In P. Lavrakas (Editor), *Encyclopaedia of Survey Research Methods*. Thousand Oaks, CA: SAGE Publications.
- O'Reilly, C. A., and Tushman, M. L. (2004). The Ambidextrous Organisation. *Harvard Business Review*.
- O'Reilly, C. A., and Tushman, M. L. (2013). Organisational Ambidexterity: Past, Present, and Future. *The Academy of Management Perspectives (in press)*, 1-30.
- Page, A. L., and Schirr, G. R. (2008). Growth and Development of a Body of Knowledge: 16 Years of New Product Development Research, 1989-2004. *Journal of Product Innovation Management*, 25, 233-248.
- Raisch, S., Birkinshaw, J., Probst, G., and Tushman, M. L. (2009). Organisational Ambidexterity: Balancing Exploitation and Exploration for Sustained Performance. *Organisation Science*, 20(4), 685-695.
- Ramayah, T., Sulaiman, M., Jantan, M., and Ching, N. G. (2004). Organisational Learning, Proprietary Technology, and Manufacturing Performance: A Glimpse from the Malaysian Manufacturing Firms. *International Journal of Innovation and Incubation*, 1(1), 63-90.
- Schudy, C. A. J. (2010). *Contextual Ambidexterity in Organisations: Antecedents and Performance Consequences* (Doctoral dissertation, The University of St. Gallen, Bamberg).
- Shamshurin, A. (2011). *Beyond Lean Manufacturing: The Productivity, Innovator's and Productivity Dilemmas Resolved* (Doctoral dissertation, RMIT University).
- Teece, D. J. (2007). Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance. *Strategic Management Journal*.
- Tinoco, J. K. (2009). Strategic Ambidexterity in Innovation: An Indispensable Capability in the Face of Change. In *Science and Innovation Policy, 2009 Atlanta Conference on Science and Innovation Policy* (pp. 1-8). IEEE.
- Venkatraman, N., Lee, C.-H., and Iyer, B. (2007). *Strategic Ambidexterity and Sales Growth: A Longitudinal Test in the Software Sector*, Retrieved November 13, 2011, from [http://www.softwareecosystems.com/SMJManuscript\\_revised.pdf](http://www.softwareecosystems.com/SMJManuscript_revised.pdf)
- Visser, M. d., Weerd-Nederhof, P. d., Faems, D., Song, M., Looy, B. v., and Visscher, K. (2010). Structural Ambidexterity in NPD Processes: A Firm-Level Assessment of the Impact of Differentiated Structures on Innovation Performance. *Technovation*, 30, 291-299.
- Winter, S. G. (2003). Understanding Dynamic Capabilities. *Strategic Management Journal*, 24, 991-995.
- Zahra, S. A., Sapienza, H. J., and Davidsson, P. (2006). Entrepreneurship and Dynamic Capabilities: A Review, Model and Research Agenda. *Journal of Management Studies*, 43(4), 917-955.
- Zaidi, M. F., and Othman, S. N. (2014). Managing Technology and Change in New Product Development (NPD): A Dynamic Capability Perspective. *International Journal of Academic Research in Business and Social Sciences*, 4(4), 167-180.
- Zhou, K. Z., and Li, C. B. (2010). How Strategic Orientations Influence the Building of Dynamic Capability in Emerging Economies. *Journal of Business Research*, 63, 224-231.