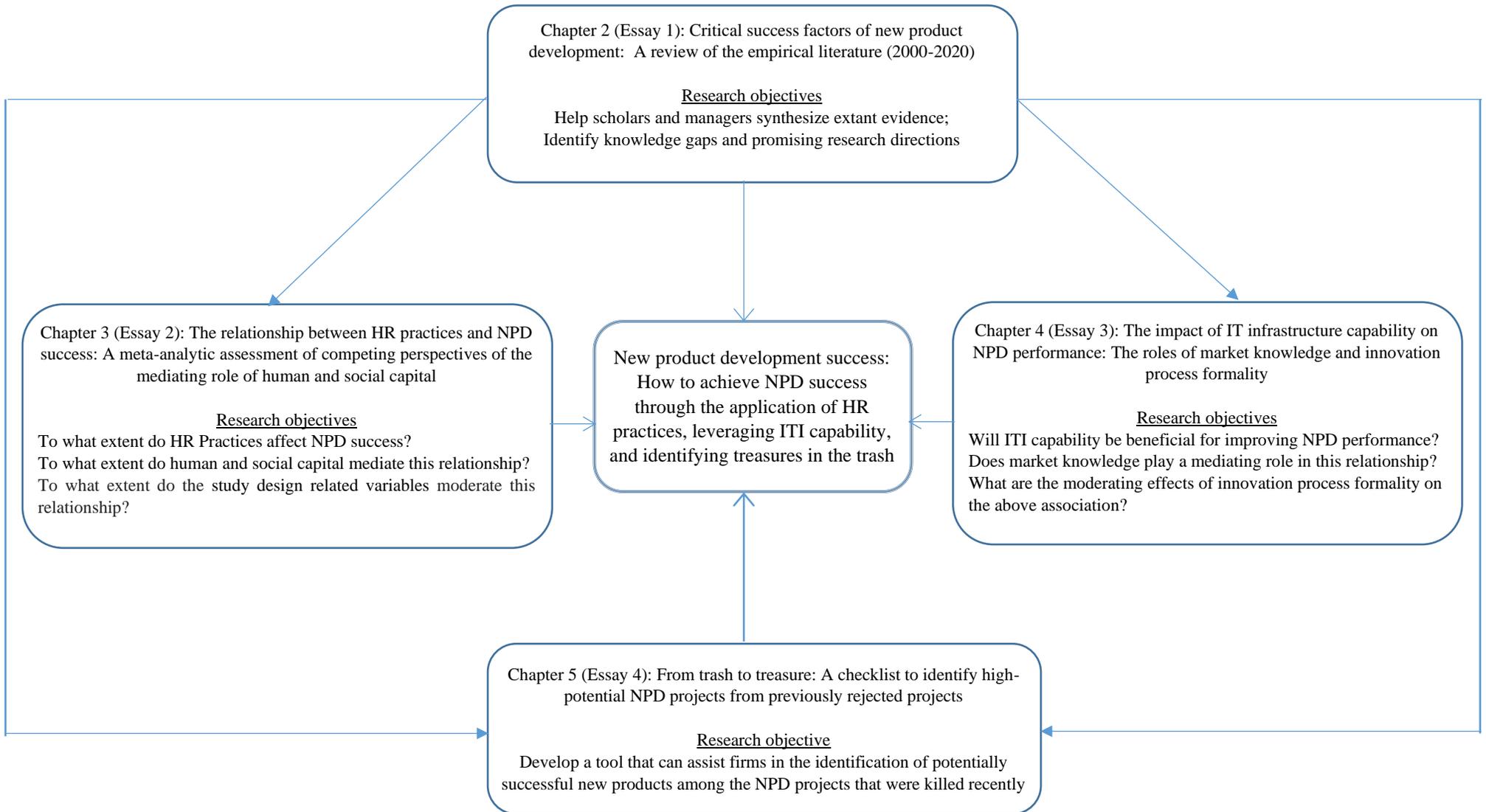


## **Chapter 6: Dissertation Conclusion**

The high failure rate of new product development has always been a challenge for many companies. With the development of technology and changes in customer needs, the timely introduction of new products with customer satisfaction has become an important means of competition for enterprises (Cooper, 2017). New environmental features such as economic globalization, the rapid shortening of product life cycles, market volatility and the rising intensity of industrial competition have resulted in new demands on new product development, not only for improved product quality and performance and lower development costs, but also for new products to be put on the market quickly and to be able to meet customers' and other stakeholders' value-added requirements (Trott, 2017; Marzi et al., 2021). Improving the success rate of new product development has become the top priority of a company's product innovation strategy.

Although scholars have continued to explore the critical success factors of NPD and have established many valuable results in the field of NPD success, a systematic literature review has revealed that considerable disagreement still exists between the findings of some studies conducted by using the different datasets and theoretical perspectives (Evanschitzky et al., 2012). Moreover, knowledge gaps remain concerning how to achieve NPD success through the application of human resource management (HRM), leveraging information technology infrastructure (ITI) capability, and identifying high-potential NPD projects from previously-rejected projects. Therefore, the overall research aim of this dissertation is to gain an understanding of the driving mechanisms of NPD success from the perspectives of HR practices, ITI capability, and innovation failure. Figure 6.1 provides a holistic research framework for the objectives of this dissertation, the specific research questions in each essay and the connections between the essays.



**Figure 6.1 A holistic research framework of the Ph.D. dissertation**

Using a variety of quantitative research methods (e.g., exploratory factor analysis, confirmatory factor analysis, multivariate analysis of variance, Chi-square test, hierarchical moderated regression, bootstrapping regression models, meta-analysis, relative weight analysis, and structural equation modelling) and qualitative research techniques (e.g., systematic literature review, secondary analysis, focus groups, content analysis, and expert panel review), this dissertation made a thorough investigation for the research objectives and questions listed in Figure 6.1.

Firstly, employing a systematic literature review approach and focusing on 163 empirical studies published in 10 top-tier journals between 2000 and 2020, Essay 1 (Chapter 2) provided an overview of past and current research on NPD success with a structured framework and identified promising directions for future research. Secondly, while several HRM related meta-analyses provide some insights in the relationship between HR practices and organizational performance (e.g., Subramony, 2009; Jiang et al., 2012), the broad conceptualisation of organisational outcomes renders it impossible to disentangle the effects on NPD success in particular. As suggested by existing meta-analyses and systematic literature reviews (e.g., Evanschitzky et al., 2012; Seeck & Diehl, 2017; Shipton et al., 2017), there is an increased necessity to conduct a meta-analysis to investigate the effects of different types of HR practices on organizational innovation performance, including new product development success. Therefore, drawing on the ability-motivation-opportunity (AMO) framework, essay 2 (Chapter 3) examined a process model that consists of both a direct relationship between AMO HR practices and NPD success and the mediating role of human and social capital.

Thirdly, there has been essential growth in the investment of IT infrastructure for product innovation in the present era of digital transformation. The substantial amounts of capital investments in ITI call for justifying its business value, and managers need to know if and how to

leverage ITI to drive NPD success (Saunders & Brynjolfsson, 2016). Therefore, essay 3 (Chapter 4) conceptualized and empirically tested the inter-relationships among ITI capability, market knowledge, innovation process formality, and NPD performance. Finally, recent research suggests that by reviewing previously rejected projects in NPD portfolios, it can be possible to identify lessons learnt and better manage and handle new projects (Raffaelli, 2019; Rhaiem & Amara, 2021). Therefore, by employing multiple qualitative methodological techniques, essay 4 (Chapter 5) enriches the Stage-Gate model and innovation literature by developing a checklist that firms can use to identify potentially successful new products (treasures) among previously rejected projects (trash). Table 6.1 summarises the conclusions and findings of each essay.

**Table 6.1 Summary of the conclusions and findings of each essay**

Essay	Conclusions and findings
Essay 1 (Chapter 2)	<ul style="list-style-type: none"> <li>• A bibliometric analysis revealed characteristics and evolutionary trends of studies in terms of research design and methodology.</li> <li>• 308 independent variables, 62 moderators, and 20 mediators that affect NPD success are identified and categorized into five dimensions using the “POCLS” framework.</li> <li>• A holistic and integrated model is developed to help scholars and managers syndissertatione the established findings.</li> <li>• Three knowledge gaps are identified and some promising research directions are recommended.</li> </ul>
Essay 2 (Chapter 3)	<ul style="list-style-type: none"> <li>• AMO HR practices and both human and social capital are positively related to NPD success.</li> <li>• Three AMO HR practices have positive and differentiated effects on human and social capital.</li> <li>• There are two different mediating paths by which AMO HR practices affect NPD success through human and social capital.</li> <li>• Results revealed moderating effects such as variable measures, sector characteristics, national culture, and publication quality in the “HR practices – NPD success” relationship.</li> </ul>
Essay 3 (Chapter 4)	<ul style="list-style-type: none"> <li>• ITI capability is recognized as a critical success factor of NPD by researchers and practitioners.</li> <li>• Theoretical and literature analysis indicate the gap in examining the ‘ITI capability – NPD performance’ linkage from perspectives of market knowledge and innovation process formality.</li> <li>• Empirical findings reveal that ITI capability is not only directly and positively related to NPD performance, but also indirectly through market knowledge.</li> <li>• The results further show that the innovation process formality weakens the ‘ITI capability – NPD performance’ relationship.</li> </ul>
Essay 4 (Chapter 5)	<ul style="list-style-type: none"> <li>• The Stage-gate model is widely used in NPD, but it pays less attention to failed NPD projects.</li> <li>• Theoretical and case analysis illustrate that there are hidden treasures in previously rejected NPD projects due to technology and/or market changes.</li> <li>• A 6-steps research process model is established by employing multiple qualitative methodological techniques.</li> <li>• A checklist is developed that firms can use to identify potentially successful new products among previously rejected projects.</li> </ul>

This dissertation makes broad contributions to the existing literature in a number of ways. Table 6.2 summarises the academic implications of each essay.

**Table 6.2 Summary of the academic implications of each essay**

Essay	Academic implications
Essay 1 (Chapter 2)	<ul style="list-style-type: none"> <li>• This essay is one of the first to present an exhaustive review of empirical research on NPD success of the first 20 years of the 21st century.</li> <li>• Findings of bibliometric and thematic analyses can help scholars better understand the development of the NPD field and advance the knowledge foundation of research methodology for NPD success research.</li> <li>• This essay revealed rewarding research questions in each specific stream. Such a critical analysis allows for a more comprehensive understanding of the remaining gaps in existing research by underscoring new avenues for future study.</li> </ul>
Essay 2 (Chapter 3)	<ul style="list-style-type: none"> <li>• The findings of this essay reconcile previously inconsistent and contradictory arguments about the mediating role of human and social capital in the “HR practices – organizational outcomes” relationship (e.g., Donate et al., 2016; Bornay-Barrachina et al., 2017).</li> <li>• This essay takes the first step by using a MASEM approach to examine the mediating mechanisms through which HR practices impact NPD success.</li> <li>• The third contribution comes from examining the study design-related moderators that have received limited empirical scrutiny in existing meta-analyses about the effects of HR practices on organizational outcomes (e.g., Subramony, 2009; Jiang et al., 2012).</li> </ul>
Essay 3 (Chapter 4)	<ul style="list-style-type: none"> <li>• This essay contributes to the ITI business value literature (e.g., Luo et al., 2012; Saunders &amp; Brynjolfsson, 2016) by investigating both direct and indirect impacts of ITI capability on NPD performance.</li> <li>• This essay contributes to the knowledge-based NPD literature (e.g., Luca &amp; Atuahene-Gima, 2007; Zhou &amp; Li, 2012; Kroh et al., 2018) by providing empirical verification about the mediating role of market knowledge in the “ITI capability — NPD performance” relationship.</li> <li>• This essay contributes to the innovation process literature (e.g., Goodale et al., 2011; Kahn, 2019) by shedding new light on the moderating effect of innovation process formality in the “ITI capability — NPD performance” relationship.</li> </ul>
Essay 4 (Chapter 5)	<ul style="list-style-type: none"> <li>• This essay extends the application scope of the Stage-Gate model, as the objects of this study are projects that have previously been rejected, which have been neglected in prior literature (e.g., Cooper, 2017).</li> <li>• This essay contributes to the NPD failure literature (e.g., Markovitch et al. 2015; Hu et al., 2017) by arguing that failed NPD projects need to be re-evaluated due to their potential for success, and our argument was confirmed by experts and executives.</li> <li>• This essay provides contributions to open innovation literature (Chesbrough et al., 2006; Grönlund et al., 2010) by identifying NPD projects that are potentially valuable in terms of outbound open innovations but failed, due to a lack of connection and consistency with the company’s business model.</li> </ul>

As a whole, this dissertation provides broad insights into the antecedents, process mechanisms, and contextual factors of NPD success from multiple perspectives of human resource management, IT infrastructure capability, and innovation failure. In doing so, my dissertation offers new knowledge that benefits academics and managers alike. Table 6.3 summarises the specific managerial implications of each essay.

**Table 6.3 Summary of the managerial implications of each essay**

Essay	Managerial implications
Essay 1 (Chapter 2)	<ul style="list-style-type: none"><li>• This essay offers managers insights into the diverse direct relationship between critical factors and NPD success at multiple levels, as well as various moderators and mediators that impact this relationship.</li><li>• The holistic and integrated model proposed for managers to enhance their understanding of the underlying mechanisms and conditions under which a particular factor affects NPD success, thus offering managers guidance on strategic choices they can realistically make.</li></ul>
Essay 2 (Chapter 3)	<ul style="list-style-type: none"><li>• Product innovation success demands HRM efforts to build knowledge-based assets (i.e., human and social capital), and also that HR systems be oriented to enhance human and social capital.</li><li>• The differential impact of the three dimensions of HR practices on human and social capital revealed in this essay provide useful insights into how managers can maximize return on investment in HR systems.</li></ul>
Essay 3 (Chapter 4)	<ul style="list-style-type: none"><li>• The findings of this essay not only justify investments in IT infrastructure, but can also guide managers in identifying the key dimensions of IT infrastructure capability building.</li><li>• Firms should strive to channel ITI capability heads to important market knowledge integration activities and establish a better firm-wide market knowledge platform to facilitate NPD practices.</li><li>• Companies should focus more on managing synergy between ITI capability and innovation process formality. A balanced innovation process design is needed to obtain a high level of NPD performance (i.e., employing an agile innovation model with a moderate formality).</li></ul>
Essay 4 (Chapter 5)	<ul style="list-style-type: none"><li>• The checklist developed in this essay enables firms to review and potentially revive previously failed projects in a structured way, which is not only helpful for reducing the sunk cost associated with these projects, but can also exploit their potential for success.</li><li>• The checklist also provides an arena for gatekeepers to continuously assess and adjust their core capabilities and resources in different NPD stages during the gate evaluation process.</li></ul>

From the overall perspective, the main limitations of this dissertation are twofold. First, this dissertation is concerned with new product development rather than new service development projects. For example, the checklist designed in essay 4 is not focused on the evaluation of failed new service development projects, and the empirical studies that were reviewed in essay 1 are also not focused on new service development. While Page and Schirr (2008) stated: “much of the new NPD knowledge will likely develop from studying unique aspects of new service development” (p. 245). Considering the unique characteristics of services compared to products, e.g., their intangibility, heterogeneity, inseparability, and perishability (Papastathopoulou & Hultink, 2012), future research could conduct a systematic review of the critical success factors of new service development, study how to adapt and validate the checklist into the service innovation context, and examine how ITI capability and HR practices affect new service development success.

Pursuing this direction would be worthwhile given the increased importance of service economies and service innovation.

Second, most of the data used in this dissertation are cross-sectional in nature; for example, 81 of the 103 studies included in the meta-analysis in Chapter 3 used cross-sectional research designs; and Chapter 4 of this dissertation used cross-sectional data as well. Cross-sectional data are inherently static and do not reflect the dynamically changing relationships between variables. Moreover, cross-sectional designs are not suitable for making causal inferences due to endogeneity bias and the possibility of common method bias (Hughes et al., 2018). As Page and Schirr (2008) pointed out: “no assumptions of causality are possible from cross-sectional data” (p. 245). We thus recommend that future studies minimise the use of cross-sectional design and conduct research that can establish causality, such as experimental design or longitudinal studies. Longitudinal research would evaluate the temporal stability of the findings concerning the critical success factors of NPD, for instance, do “best practices” vary over time? Furthermore, we suggest that researchers could conduct mixed-methods design which including three or more studies. More specifically, first, through qualitative research (e.g., grounded theory approach, action research, and multiple case studies) to build theoretical models; second, by employing randomized controlled experiments (if possible) to inspect the causality of variables in the proposed theoretical model; third, using longitudinal designs to test the hypothesized relationships between variables, and making sure to include instrumental variables to fix endogeneity, as well as with theoretically suitable time-lags (Hughes et al., 2018).

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