

DYNAMIC CAPABILITIES AND BUSINESS MODEL INNOVATION: A STUDY FOR SCALE DEVELOPMENT

*Seher OGRENCI (Orcid ID: 0000-0002-9694-7447¹)

*Lutfihak ALPKAN (Orcid ID: 0000-0002-7925-7102)

*Istanbul Technical University, TR

ABSTRACT

Based on dynamic capability theory, this paper presents a reconceptualization of the dynamic capabilities (DC) construct within a multi-layer-structure in the context of business model innovation (BMI). A rigorous multi-stage scale development process is employed. We developed candidate DC scale items based on the literature review study and reviewed them with the participation of 5 field experts. Final DC scale items have been surveyed with 121 respondents across a wide range of small and medium scale enterprises engaging in BMI. The preliminary results of exploratory and confirmatory factor analyses highlight the multi-layer nature of dynamic capabilities construct for small and medium enterprises (SME's) engaging in BMI in a developing country environment. Four subdimensions were clearly identified among Sensing Seizing and Reconfiguration dimensions across Owner_Manager and Employee layers: Owner_Manager_Sensing, Owner_Manager_Seizing and Owner_Manager_Reconfiguration, Employee_Sensing_Seizing. Furthermore, Clauss' (2017) BMI scale has been translated into local language (Turkish), validated and checked for reliability following a stepwise process. Factor analysis results paralleled the original scale. This offers a deeper and multi-layered tool for measuring sub-dimensions of both DC's and BMI beyond the limitations in the prior research.

Keywords: Business Model Innovation, Dynamic Capabilities, Scale Development

INTRODUCTION

Ground-breaking developments in technology and increasing competition in marketplace not only enforce but also encourage small businesses to try to make innovation in various business components such as product, process, marketing, or organisation [e.g., Ulusoy et al. (2008a); Ulusoy et al. (2008b); Oydağ, 2019; Alpkhan and Gemici (2023)]. Nowadays, increasingly high number of innovation projects treat the whole business instead of focusing only one of its components. Especially innovations done in the way of doing business and their possible antecedents attract both scholars' and practitioners' interest due to their direct impact on firm performance. The new challenge is about understanding the innovation of the whole business model (BM) and getting insights about the conditions and antecedents leading to the new BM [Massa and Tucci (2014). DC subject is frequently listed on the top of the BMI antecedent list (Foss and Saebi, 2017) and therefore it is a major focus area in the innovation literature.

The BM term became pervasive and popular after the 1990s; it coincides with the rise of the internet dot.com era. The increasing use of BM concept is due to its virtue in compensating the difficulty of understanding dot.com business even in case of its missing past performances due to its novelty. It provides a better input to the firm valuation process than the presentation of any of its components alone to satisfy investors of those internet firms. The usage of BM sharply increases after 2000s (Massa et al., 2016). BMI has been promoted as the enhanced solution for dealing with such a turbulent environment and used for understanding and explaining the components of the business, configuring all of them in coherence, measuring and continuously reconfiguring (DaSilva and Trkman, 2014). Indeed, BMI requires establishing new capabilities or extending, strengthening, and re-orchestrating current capabilities and it provides a better account of how the resources and capacities can be used for developing business components fitting together to form a successful new BM (Madsen, 2010).

¹ Corresponding author

Teece built the DC framework to better explain the required second order capabilities to overcome the organizational rigidity and to adapt to the new BM. DCs are sensing, seizing and reconfiguration skills (Teece 1997), entrepreneurial management and transformational leadership skills, supported by managerial cognition and embedded in the organizational routines (Adner and Helfat, 2003; Cirjevskis, 2017). Understanding the nature of DC is important because it helps enterprises to recognise their capacities to integrate, build, and reconfigure internal and external resources/competencies in the presence of a changing environment. In this study, we focus on Teece's DC scale defining dynamic capabilities as firms' abilities of sensing to identify changes in the environment, including customer needs, competitor behaviour, and technological advancements; of seizing to anticipate, shape, exploit opportunities and avoid threats to capitalize on market trends, expand customer base, and increase revenue, and of reconfiguring to reorganize its resources and capabilities to respond to environmental changes effectively adapting their organizational structure, processes, and routines to align with the new requirements transforming the business. (Teece, 1997; Dasilva and Trkman, 2014)

Some scholars have criticized Teece's DC framework for lack of clarity and specificity in definition and operationalisation of DC. They argue that the framework is too broad and vague, making it difficult to apply and to measure outcomes in practice (Helfat and Peteraf, 2015). Zollo and Winter (2002) criticize Teece's model of DC not explaining how they evolve. Instead, they incorporate classic evolutionary paradigm's variation- selection-retention phases with organisational learning mechanisms, ranging in different degrees of intentionality and efforts to turn implicit knowledge into explicit one. Fulfilment or possession layer of DCs in the origination shows a fragmented structure in the literature on DC and proceeds in two independent perspectives: (1) DC are codified into the organisational layers as routines, systems, procedures, pattern, and custom (Basile and Faraci, 2015; Eisenhardt and Martin, 2000; Sprafke et al., 2012) by learning mechanisms; and (2) Managerial and individual capabilities such as decision making, interpretation, comprehension, sense-making, reconfiguring, entrepreneurial alertness, leadership, or ad-hoc problem-solving are also mentioned in the DC literature (Saul and Gebauer, 2018; Schoemaker et al., 2018). The present study aims to develop two reliable and valid measurement scales and derive questions for constituent items of DC construct and BMI construct in Turkish. The BMI scale has been developed by the translation and adaptation of Clauss' (2017) scale into Turkish. The DC scale has been originated from the Kump's et al's (2019) scale on Teece's DC framework and developed further to include individual and organisational layers to compensate the critiques indicated in the literature.

Problem Statement and Research Questions

Innovation plays a crucial role in creating competitive advantage by developing market share, revenue, and growth at an overall organizational level, and the innovation strategy is one of the key elements of corporate strategies that concentrates on continuously learning from customers, competitors, and mistakes done earlier to increase innovative performance (Gemici and Alpkan, 2015; Alpkan and Doğan 2008). Accumulation of competences gained and updated need to be translated into innovations via DCs and BM in order to ultimately sustain organizational performance.

Despite the increasing number of articles written on BM, it is said to suffer from the lack of a widely accepted definition throughout its journey in the literature (Dasilva and Trkman, 2014; Pietrewicz, 2019). BM is inferred as a set of concepts, objects, and relations reflecting the business logic (Osterwalder et al., 2005), value drivers of a business (Amit and Zott, 2001), a tool to build up a successful business (Baden-Fuller and Haefliger, 2013), and the architecture of revenue (Chesbrough and Rosenberg, 2002). BM is also used as the unit of innovation explaining classical categories of product, service, process, market, distribution innovations within a holistic perspective (Trapp et al., 2018; Zott et al., 2011). The BM facilitates the value creation out of innovation and the exploitation of the opportunity through an entrepreneurial approach (George and Bock, 2011). Scholars seem to agree on explaining BM and BMI concepts disaggregating them into components such as: "technical potential and economic value" (Chesbrough and Rosenbloom, 2002), "value creation, value delivery, and value capture dimensions" (Osterwalder et al., 2005, Osterwalder and Pigneur, 2010, p. 14; Baden-Fuller and Haefliger, 2013; Clauss, 2017). The latter is recognised as the business canvas in practice and has found widespread use among entrepreneurs to define, develop, and pivot their business components in the BMI process. The value creation dimension is the answer to the question: How and by what means firms create value for the customers? The answer contains various capabilities and resources such as core competencies, internal and

external resources, knowledge, equipment, technology, partnerships, networks, organisational processes, and activities. The value proposition dimension contains the solution for the customer including products, services, and their constituents such as branding, value chain, customer segments, customer relationship, and channel. The value capture is the financial component of the BMI including both cost and revenue sides such as cost structure, cost estimation, revenue model, revenue stream, pricing mechanism used to estimate and calculate profit (Baden-Fuller and Haefliger, 2013; Clauss, 2017).

Teece built the DC Framework on three dimensions sensing, seizing, and reconfiguration. The measurement scale is structured at the firm level and the fulfilment layer of items under sensing, seizing and reconfiguration dimensions stay anonymous (Ogrenci et al., 2023). Further development of Teece's DC scale to include the fulfilment layer structured under individual and organizational levels is needed. Furthermore, DC and BMI studies are rare in a developing countries facing different impediments while building a new BM than developed ones: scarce resources, high input cost, limited funding, volatile economic environment, and vague political trajectories (Karatas ,Ozkan et al., 2011; Rashid and Ratten, 2020; Ogrenci et al, 2023). Hence lack of detailed DC and BMI scales generated specifically for the developing country context is a deficiency in the literature.

This study is focused to answer two main research questions in the SME context of a developing country: (1) what is the factor structure of BMI dimensions? (2): What is the factor structure of a DC scale considering fulfilment layers? Therefore, the purpose of the study is to develop two reliable and valid measurement scales and derive questions for constituent items of DC construct and BMI construct in a developing country environment and in the local language. Incorporating both perspectives into the DC framework and attempting to investigate DC in the context of BMI with considering their fulfilment layers will enrich the literature extending the theory and add practical value. Therefore, 30 items BMI scale developed by Clauss (2017) has been translated to Turkish and adapted to the developing country environment through a stepwise procedure, and DC Scale developed by Kump et al. (2019) based on the Teece's DC framework (1997) has been restructured in Turkish with the aim of identifying the fulfilment layer of DC subdimensions, following a scale development procedure.

RESEARCH METHODS

Formation Of Questionnaire Items

The present study aims to develop a valid and reliable scale to measure the DC construct in the context of SME involving in BMI in a developing country environment. Firstly Clauss's (2017) BMI scale has been chosen due to the virtue of its deep literature review and subtle derivation process. It is translated through a process guided by Sousa and Rojjanasrirat (2011) from English to Turkish by two experts independently. The agreed version of questions has been created upon their review session. The questions have been piloted with 5 entrepreneurs, experts on BMI and SME environment, and wordings have been aligned in order to apply to the entrepreneurial and SME terminology. The relevance and representativeness of the items are checked through content validity analysis. The final version of questions was checked for clarity and understandability through a pre-test. The translated BMI scale has been checked for reliability of its dimensions and as a whole. The development procedure of a new DC scale is detailed in accordance with steps proposed in Hinkin (1995). The study started with an extensive literature survey identifying weaknesses of the theory. The initial list of DC items is derived through the literature survey. Teece's DC framework dimensions represented in Kump et al. (2019) have been chosen as the origination point of the new DC scale. The scale has been strengthened to cover fulfilment layer and remedy the deficiencies depicted as the lack of clarity, difficulty of measurement, and application to the practice. The new DC scale stretches items under Teece's dimensions of sensing, seizing, and reconfiguration across organizational layers in order to bring the opportunity of understanding DC of owner-manager and employee layers and apply them to the practical world. Questions are pre-tested with deep interviews with 5 entrepreneurs frequently involving into BMI in SME environment. The qualitative phase to identify validity of the potential scale items, is followed by a quantitative phase to assess the reliability of the scale.

Data Collection

A web-based questionnaire has been prepared through Google Forms including 30 questions for the BMI scale and 24 questions for the DC scale structured in owner-manager and employee's layers and demographic questions about the company such as the year of establishment, its target sector, number of employees and about the respondent such as position in the company, how many years they have worked in the company and throughout their working life. Interviewees were asked to state their level of agreement ranging from strongly disagree to strongly agree on a 5 point-Likert scale for DC (Appendix I) and BMI questions (Appendix II). The questionnaire has been sent to 5 entrepreneurs, experts on BMI and SME environment. After they answered the questions, they are asked to define what they understood from each question. Their definition is matched with the definition of the candidate items for a new and translated scale. Questions are reworded and restructured based on pre-test results. Following the pre-test, the questionnaire has been sent to SME's involving in BMI. Their BMI relation has been identified through company websites and confirmed by a screening interview. Company owners or top managers are chosen as target respondents as they are the only party who can see the whole picture of the company BM, innovation actions and capabilities in various layers of the company. They are asked to answer the questions through the electronic form or offered the option to speak to the author reading interview questions. In the latter case, the author inputs the selected answer to the electronic form. 121 valid answered forms have been collected through Google's tool. They are transferred to IBM's SPSS (28) tool for data analysis.

FINDINGS

Responding companies were selected from a broad range of size, age, and sector. 53% of companies are small enterprises (less than 50 employees), 34% are medium scale enterprises (number of employees between 51-500) and lastly 13 % of them are larger in size (above 500 employees). Sectors of companies are information technology (52%), manufacturing (19%), service (12,5%), finance (7,5%) and others (9%). The age distribution of the companies are as follows: 40% are less than 10 years old, 22% are between 10 and 20 years old, and 37% are over 20 years old. 27 % of respondents are owners of the company and 73 % are from the top management team. 68% of respondents have more than 20 years of experience, 28% have experience between 10 and 20 years, and only 4 % have under 10 years of experience.

Results For New Dc Scale

Reliability of the total DC scale, its subdimensions and its layers are checked through the coefficient of Cronbach's Alpha. Results ranged from 0,768 to 0,898 for its subdimensions and it is 0,930 for DC in general, reflecting very high reliability. For this data set, KMO sampling adequacy is high as 0.861, and Barlett test is highly significant (<0.001), which indicates the appropriateness of using factor analysis. DC subdimensions were analysed by factor analyses with Varimax rotation. Loadings below 0,35 are suppressed from the result matrix. Items loading more than one dimensions with similar values (less than 0.1 difference) are excluded, in other cases, the item with highest loading is kept in the subdimension if it is higher than 0,5. The lower loaded items are kept out of the scale. Results are displayed in Appendix 1. Factor analysis for the new DC scale has been run for various combinations of DC subdimensions (sensing, seizing, and reconfiguration) vs DC layers (individual DC_Owner Manager and organisational DC_Employees). In this study we share the most significant scale proposal arising from the preliminary analysis based on the data set formed by the answers of 121 samples. DC at Owner_Manager Layer ends-up in three different factors: Owner_Manager Sensing, Owner_Manager Seizing and Owner_Manager_Reconfiguration. However, our study shows that the new DC scale is structured in both individual and organisational layers and yielded some deviances from Kump's et al's scale. DC on Owner-Manager layer load to three independent factors. The first factor is Owner_Manager Sensing which is constituted by three items, as the "sensing through customer group" item is excluded due to cross-loading. The second factor, Owner_Manager Seizing is constituted only by two items, those items are "being capable of turning new technological knowledge into process and product innovation" and "being able to develop new product and services using information obtained". The other two items, "investing to produce a solution for the customer" and "being quick in decision making for internal processes" which were expected to be in this factor, have loaded significantly to the factor of Owner_Manager Reconfiguration. This factor is constituted by five items, two joining from seizing dimension and other three from reconfiguration dimension itself.

Only the item related to “consultancy and training” is kept outside due to being slightly below the significance limit with loading value of 0,498. The fourth and the last factor arising from the factor analysis of new DC is constituted by the items of Sensing and Seizing subdimensions at employee layer. Eight employee level capabilities indicated as sensing and seizing items have been emerged significantly in the DC scale as addition to the Owner-Manager layer capabilities.

Results For Translated And Adapted Bmi Scale

Reliability of total BMI scale and of its subdimensions are checked through the coefficient of Cronbach’s Alpha. Results ranged from 0,813 to 0,953 reflecting very high inter-item reliability. For this data set, Kaiser-Meyer-Olkin (KMO) sampling adequacy is high, 0.904, and Barlett test is highly significant (<0.001), which indicates the appropriateness of using factor analysis. BMI sub-dimensions were analysed by factor analyses with Varimax rotation. Loadings below 0,35 are suppressed from the result matrix. Items loading more than one dimension with similar values (less than 0.1 difference) are excluded from the scale due to cross loading, in other cases the item is kept in the scale considering its highest loading if it is above 0,5. The lower loaded item is kept out of the scale. Results are displayed in Appendix 2. BMI scale factor analysis under 9 factors, points out a pretty similar result to the one found by Clauss (2017). However, the translated scale shows some deviances, specific to SME’s in a developing country environment. First of all, Value_Creation dimension of BMI consists of three subdimensions. Items of New Capabilities and New Processes dimensions load jointly to the first factor. Items of New Technologies and New Partnership subdimensions load to second and third factors independently. Value_Proposal dimension of BMI consists of four subdimensions as in the case of Clauss (2017). The only difference is that the fourth item, “We regularly take opportunities that arise in new or growing markets” is eliminated from the New Market and Segments subdimension due to cross loading. Lastly, Value_Capture dimension consists of two subdimensions as in the case of the original scale. However, there is a difference in New Income subdimension, it is loaded only by two items as the item “We recently developed new revenue opportunities” is eliminated due to cross loading. As a result, three dimensions, nine subdimensions and 28 items have emerged with significant loading in the proposed BMI scale. 18 items under four dimensions, three being in Owner-Manager layer and one being in employee layer, have been emerged as significant in newly developed DC Scale.

CONCLUSION

This study makes the following contributions to the literature. First, it provides a BMI scale in Turkish by translating and adapting Clauss’s BMI scale into the SMEs in a developing country environment. Second, it delivered preliminary results for the enriched DC scale developed based on Kump’s et al’s (2019) scale, extending it to the fulfilment layer. We presented validity and reliability check results for both, the scale translated, and the new scale developed. Scale studies and corresponding questions are tested through 121 respondents’ data, gathered from local SME’s involving in BMI. As the result, the BMI literature gained a valid and reliable BMI scale in Turkish, adapted for SMEs in a developing country environment and the DC literature is enriched by the addition of a new DC scale considering the construct in individual and organisational layers. The newly developed scale provided an answer to the critiques about lack of clarity and specificity and points out a better way of measuring outcomes in practice. Additionally enrich the literature by extending the DC framework into organisational layers. Besides all this contribution we should admit that our study is still in preliminary phase. Increasing number of respondents would enhance validity and reliability results of the scale. This is still a premature scale, future research could further investigate the construct validity of the scale by examining its correlations with other measures of DC construct. Additionally, future research could dig on the generalizability of the scale by testing it in other developing countries. Overall, the translation of BMI scale and development of the new DC scale provide a valuable tool for researchers and practitioners working with SMEs in Turkey. The multi-layer nature of the DC scale may help SME’s in their way to BMI, by pointing out capabilities required in different organisation layers. As the preliminary results, Owner_Manager and Employee layers emerge as independent factors in measuring DC. Owner-Manager layer DC are presented in three subdimensions as sensing, seizing, and reconfiguration. In SME’s, depending on the size and the organisation structure, those results point out that the Owner-Manager layer has a significant role in all three sub-dimensions of DC. On the other hand, Employee layer DC are also emerging as a significant factor in the scale for the combination of sensing and

seizing subdimensions. SME's should also consider the role of employees in BMI especially while sensing and seizing new BM and assign the departmental responsibilities accordingly.

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Appendix 1: Questionnaire Items and Factor loadings for DC Dimensions

Dimen- sions	Questionnaire Items	Factor Loadings
Owner_Manager Sensing	1. Our company partners/senior managers have up-to-date information about the general market situation.	.732
	2. Our company partners/senior managers Continuously observe the activities of our competitors to gain knowledge.	.703
	3. Our company partners/senior managers Continuously observe target customer to identify their needs <i>(Excluded due to cross loading)</i>	.465
	4. Our company partners/senior managers are in continuous communication with various stakeholders in the market.	.707
Owner_Manager Seizing	5. Our company partners/senior managers have the ability to use newly acquired technological knowledge to improve business processes.	.697
	6. Our company partners/senior managers have the ability to develop new products and/or services with newly acquired knowledge.	.718
Owner_Manager Reconfiguring	7. Our company partners/senior managers invest to provide solutions for our customers.	.603
	8. Our company partners/senior managers make decisions about business processes very quickly.	.816
	9. Our company partners/senior managers Continuously lead change projects.	.769
	10. Our company partners/senior managers share the new knowledge they learn with other employees of the company in a regular manner.	.571
	11. Our company partners/senior managers benefit from training and/or consultancy to improve their skills. <i>(Excluded due to low loading)</i>	.498
	12. Our company partners/senior managers are quick to adapt to new working methods.	.634
Employees' Sensing and Seizing	13. In our company, there are routine practices that employees follow to access up-to-date information about the market situation.	.752
	14. In our company, there are routine practices that employees follow to gain knowledge by continuously observing the activities of our competitors.	.759
	15. In our company, there are routine practices that employees follow to identify the needs of the target customer base.	.773
	16. In our company, there are routine practices that enable employees to be in communication with various business partners and teams in the market.	.730
	17. In our company, there are routine practices that enable employees to use newly acquired technological knowledge to improve business processes.	.805
	18. In our company, there are routine practices that employees follow to develop new products and/or services with newly acquired knowledge.	.825
	19. In our company, there are routine practices that employees follow to provide solutions for our customers.	.737
	20. In our company, there are routine practices that employees follow to make decisions about business processes very quickly.	.765

Appendix 2: Questionnaire Items for BMI Factors

Dimensions	Questionnaire Items	Factor Loadings
Value Creation: New Capabilities /Processes	21. We continuously research the competencies we need to adapt to changing market requirements.	.588
	22. Thanks to the various trainings we provide to our employees, we have gained new knowledge, skills and competencies.	.800
	23. Our employees have much more up-to-date information and/or new skills than our competitors' employees.	.610
	30. We were able to significantly improve our workflow processes.	.579
	31. We used innovative procedures and processes during the production of our products.	.557
	32. We have improved the existing processes by regularly reviewing them	.564
Value Creation: New Tech	24. We kept our company's technological resources up to date.	.647
	25. We kept our technological equipment more up-to-date than our competitors.	.833
	26. We regularly evaluated new technological opportunities to expand our product and service portfolio.	.566
Value Creation: New Partners	27. We are continuously in search of stakeholders who will make new collaborations.	.736
	28. We regularly evaluated the potential benefits of outsourcing.	.747
	29. New collaborations have helped us further develop our business model.	.753
Value Proposal: New Offerings	33. We regularly reviewed emerging and unmet customer needs.	.562
	34. Our products or services have been very innovative compared to our competitors.	.674
	35. Our products or services have solved customer needs that cannot be solved by competitors.	.682
Value Proposal: New Market & Segment	36. We regularly evaluated the opportunities emerging in new or growing markets. <i>(Excluded due to low loading)</i>	.432
	37. We regularly considered new and underserved market segments.	.568
	38. We are continuously on the lookout for new customers/markets for our products and services.	.510
Value Proposal: New Channels	39. We regularly used new distribution channels for our products and services.	.774
	40. We worked to increase the continuous efficiency of our distribution channels.	.834
	41. We have continuously reviewed and renewed our distribution channels.	.858
Value Proposal: New Customer	42. We tried to increase our customer retention rate with new service offerings.	.698
	43. We used innovative / modern methods to increase customer retention.	.610
	44. We have taken many steps to strengthen customer relations.	.663
Value Capture: New Income Structure	45. We have developed new revenue opportunities (e.g. up-sells, cross-sells). <i>(Excluded due to low loading)</i>	.440
	46. We have developed additional services that are integrated into our existing products to ensure long-term financial returns.	.722
	47. We have switched to a long-term revenue model that provides regular revenue alongside/instead of our one-time sales revenue on order.	.782
Value Capture: New Cost Structure	48. We evaluated alternatives by constantly reviewing our pricing strategy.	.608
	49. We have been actively seeking solutions to save production costs.	.794
	50. By constantly examining our production costs, we tried to improve them according to market conditions when necessary.	.757