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DYNAMIC CAPABILITIES IN ABMIDEXTROUS ORGANISATION, DECISION MAKING PATTERN FOR SUSTAINABLE FUTURE

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Abstract. The paper adds to the understanding of *how* dynamic capabilities shaped in ambidextrous organization like Google, Inc. In recent years Google, Inc has diversified from internet search across a broad range of internet products including email, photo management, satellite maps, digital book libraries, blogger services, and telephony. The paper has theory focus, uses qualitative empirical data, illustrates an innovative practice of one of the leader of ICT (Information and Communications Technology) industry and takes the form of demonstration. The paper is trying to unpack the nuances of ambidexterity that often drive successful firms. The paper is based on a qualitative analysis of Google, Inc. The research demonstrates how the ambidextrous strategic thinking and the dynamic capabilities create flows of innovative products and serve to generate micro foundations of sustained competitive advantages. The author is going to make a longitudinal study on current topic.

Keywords: innovation, dynamic capabiltities, ambidexterity, exploration/exploitation, ICT industry

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1. Introduction

Management theories dynamic capabilities are young and fragmented and generally there is not much of a guide for executives except on certain narrow issues (Teece 2011). It is not enough that we know what organisations do, which markets they enter, which products they introduce, how fast they grow, which firms they acquire, but also how they do it (Wahl & Prause 2013). We try to address to demonstrate how dynamic capabilities actually operate in successful ITC industry's company. This paper presents the dynamic capabilities framework (Teece 2007) which is increasingly providing the set of tools for both theoretical and applied analyses of the sources of competitive advantages of organization and other strategic issues facing business decision makers. The paper aim is to add the understanding of dynamic capabilities as a sources of competitive advantage by demonstrating that dynamic capabilities (DC) development unfolds in three steps, from recognition that the environment has changed (monitoring and sensing), to the decision to deploy DC (analyzing and deciding) and to the implementation of assets re-orchestration (implementing) and thus create a micro foundations of sustained competitive advantages. The research offers insights into the composition of micro foundations of dynamic capabilities and demonstrates that dynamic capabilities can be unbundled into well-known and concrete strategic concentric diversification activities. The paper thereby adds to the growing research on dynamic capabilities by illustrating the dynamic capabilities strategic thinking in ambidextrous organization. A deductive case study explicated the relationship between ambidexterity, dynamic capabilities and micro foundations of sustained competitive advantages.

2. Literature review

The exploration on how to manage organizational resources and capabilities to sustain competitive advantages remains the intriguing unit of research of strategic management science. As organizations are tending to be successful, the variety of managerial and organizational literature refers them to strategic management and introducing the term of ambidextrous organization as the possible way for successful solution (Duncan 1976; Gibson & Birkinshaw 2007: Tushman & O'Reilly 1996). Structural ambidexterity is concentrated on decentralized decision making (Tushman & O'Reilly 1996). Another form of contextual ambidexterity was introduced to extend structural ambidexterity (Gibson & Birkinshaw 2007). The idea of new form of contextual ambidexterity was to balance exploration and exploitation at a firm unit-level. For that purpose it was assumed to presume organizational capabilities which facilitate superior performance and thus sustain competitive advantage (Gibson & Birkinshaw 2007). Rezk et al (2015, p.52) argue that "innovation activities include all scientific, technological, organizational, financial, and commercial steps that actually lead, or are intended to lead, to the implementation of innovations. Some of these activities may be innovative in their own right, while others are not novel, but are necessary for implementation". Jansen (2005) defined ambidexterity as the ability to simultaneously pursue both incremental and discontinuous innovation and change. Exploitative innovations build upon existing knowledge and meet the needs of existing customers. Exploitative innovations are incremental innovations and are designed to meet the needs of existing customers or markets (Benner & Tushman 2003; Danneels 2002). Exploratory innovations require new knowledge or departure from existing knowledge and are designed for emerging customers or markets (Benner & Tushman 2003). Exploratory innovations are radical innovations and are designed to meet the needs of emerging customers and markets (Benner & Tushman 2003; Danneels 2002). There is few empirical research and examples how ambidextrous organizations are able to simultaneously pursue exploratory and exploitative innovations (Gibson & Birkinsahw 2007; Tushman & O'Reilly 1996; Beenr & Tushman 2003). The nature of ambidexterity is also implicitly recognized in the dynamic capabilities literature which urges the need to blend the different strategic logic - exploitation and exploration- within one organization (Acona et al. 2001; Teece 2011).

The dynamic capabilities view (DCV) has arguably become the theoretical centerpiece of efforts to understand how firms can successfully compete in changing environment. Dynamic capabilities can usefully be thought of as belonging to three clusters of activities and adjustments: identification and assessment of an opportunity (sensing); mobilization of resources to address an opportunity and to capture value from doing so (seizing); and continued renewal of core competences (transforming) (Teece 2007). One key implication of the dynamic capabilities concept is that firms are not only competing on their ability to exploit their existing resources and organizational capabilities, firms are also competing on their ability to explore, renew and develop their organizational capabilities /10/. This is especially true for ITC companies competing in global changing markets. During the last two decades, research in dynamic capabilities has promised to unlock understanding of how competitive advantage arises in dynamic markets. It's imperative Teece's (2007) paper here as this is the seminal piece on micro foundations of sustained competitive advantages. There has also been a Special Issue of SMJ on the 'psychology of strategic management'. Excellent contribution was added by Hodgkinson & Healey's (2011) paper that rethinks Teece's (2007) piece and focuses in more depth on the micro foundations of dynamic capabilities. However to date, empirical work has by and large focused on what dynamic capabilities are. There has been little work demonstrating how they actually operate and contribute to micro foundations of competitive advantage other than at the conceptual level (Amstrong, Macintosh & Maclean 2012). In this paper, we present a case study of Google, Inc organization that successfully adapted to major changes in its complex setting of global ITC competitive environment. In analyzing this cases, we shed light on the nature of dynamic capabilities and their link to performance outcomes as well as demonstrate that dynamic capabilities is a necessary condition for successfully adapting to environment changes and sustain competitive advantages.

3. Discription of investigation

We have selected an object of research the ogranisation that is especially active and interesting in ICT industry: Google Inc. The ICT industry is selected for the following reason. ITC industry is highly dynamic market, due to the reason that it is global, with relatively low entrance barriers, requiring huge investments in intangible assets and extremely capacity of specific knowledge and experience. According to the theory, in highly dynamic markets, the suggested routines have to be efficient and dynamic. In such situations there is a call for dynamic capabilities of the ITC players. Google is going through substantial change due to the technological shift that cloud computing is giving (Ilinitch, D'Aveni & Lewin 1996). In recent years Google has thremendously suscefelly diversified products range and expanded from internet search across a broad range of internet services including email, photo management, satellite maps, digital book libraries, blogger services, and telephony.

Thus we defined the first research question for this study as follows: How are ambidextrous strategic thinking developed by Google, Inc pursuing product diversification strategy? Second research question has been defined as follows: how dynamic capabilities and their microfoundations actually operate in Google Inc groups and contribute to its competitive advantage? We answer on the research questions by using CEO statements, company reports, case studies and press releases from the company web pages. This can boost our data to get at a micro-level understanding of dynamic capabilities (Barr, Stimpert & Huff 1992). Using DCV theory and data sources, the strategic thinking pattern of dynamic capabilities of ambidextrous organization: one of the leaders of the ICT industry to innovate the industry is identified. The research questions are phenomenon-driven and according to Eisenhart & Graebner (2007) it is appropriate using a single case if a phenomenon-driven research question is subject to investigation. Regarding research is investigating one single case, Siggelkow (2007) notes that it "can be a very powerful example". In fact, it is a major advantage of case study research that the chosen case studies as a Google in our research can be investigated in depth which would not be possible with a large case sample (Eisenhardt & Graebner 2007). Regarding to presentation of evidence, Eisenhardt & Graebner (2007) state that there is no strict norm as in deductive (large-scale) studies when presenting results.

4. Data analysis and interpretation

According to the case study research data, ITC organizations are confronted with the tension between exploiting what they know and exploring what they do not know since both exploitation and exploration are essential capabilities to their long and short term survival. According to the Google case study research (Edelman & Eisemann 2010), there are basis to believe that Google is able to perform two things at the same time – generate and apply the knowledge through knowledge management system. Google is engaged in both exploitation (refinement, choice, production, efficiency, selection, implementation and execution) and exploration (search, variation, risk taking, experimentation, play, flexibility, discovery, innovation) and successfully implies ambidextrous strategic thinking in the organization to ensure the company's competitive advantages. The knowledge processes within Google organization can be illustrated as follows. First stage is knowledge generation stage (exploration of new opportunities). Algorithmic search became the successful exploratory innovation and it has been licensed by Google. This action helped Google to enter the market, to surpass all rivals and ensure Google's revenues in 1999. In the end of the same year, reacting to the pioneered by Overture monetize search, the company had also introduced its first paid listings, but with different approach on a cost-per-impression basis. Simultaneously, Google developed a range of new services in advertising and introduced Froogle, thus generating and exploiting the knowledge simultaneously. The same situation with Google maps, which has been generated and launched in year 2005. In addition to that the ambidextrous strategic thinking of Google took the company into other directions, namely: hosting of video and books, communications applications such as Gmail and Gchat messaging as well as voice communications and some others, all these actions helped Google to diversify and grow by generating and implementing knowledge simultaneously and constantly. Second stage is knowledge application stage (exploitation of existing capabilities). Due to the reasons that the search systems often failed to deliver useful results, Google used double loop model of learning and company's engineers constantly fine-tuned search algorithms. Thus, the company proved to be in constant learning process and exploitation of its existing capabilities. Simultaneously, to the advertising scope actions mentioned before in the knowledge generation stage, Google

expanded the efforts on attracting more advertisers by offering them free software to optimize campaigns. Furthermore, Google improved on policy of paid listings by considering listings relevance and these improvements made the product more sufficient and more competitive. All these simultaneous actions on knowledge generation and its application, as well as constant learning process describes the ambidextrous features of Google strategy aiming to achieve a balance between exploration and exploitation activities. Taking into the consideration the unconventional management practices of Google, it would be possible to underline that Google is inclined to contextual ambidexterity features (Edelman & Eisemann 2010). How did they do it? We assert that radical innovation is akin to exploration and incremental innovation is akin to exploitation. Table 1 summarizes the differences between exploratory and exploitative intangible assets along selected dimensions.

Table 1. Ambidextrous strategic thinking at Google.

	Exploratory innovations	Exploitative innovations		
	Knowledge creation	Knowledge application		
(Innovation through research proces		(Broadening the existing knowledge and skills;		
		improve and expand existing products)		
	PageRank algorithm as the new search	Constant improvements of search algorithms through		
Search algorithms	technology in 1999	incremental innovations approach		
technology	As a result – license of new technology,	As a result - Personalized Search launched in 2004		
	market entrance and revenues in 1999			
	Introducing paid listings sold on cost-per-	Expanding beyond search advertising by launching		
	impression basis in 1999	"contextual" paid listings – AdSense in 2003		
	In 2002 using Overture's cost-per-click	Developing new service – Froogle		
	model	Free service - Google Analytics to identify which		
Advertising	DoubleClick with placing display	keywords yield the most sales		
	("banner") advertisements	Location-based paid listings at Google Maps in 2005		
	Radical innovations Google AdSence,	Acquisition with DoubleClick – expanding AdSense		
	Froogle and Google Analytics are designed	to show display ads		
	to meet the needs of emerging customers			
	and markets			
	Competitors Internet maps before 2005			
Google Maps	Radical innovations Google Maps are	In 2005 launching Google Maps – faster scrolling and		
Google Maps	designed to meet the needs of emerging	browsing than competitors.		
	customers and markets			
	Yahoo! Mail and Hotmail offering 2-4MB			
	space	In 2004 launching free email - Gmail with space of 1		
Communication	Radical innovations Android platform is	GB with interface advances.		
applications	designed to meet the needs of emerging			
принатопо	customers and markets	In 2008 launching Android platform – free, open		
	Expanding into real time and voice	source mobile-phone operation system		
	communication – Goole Voice			
	Sharing/ cloud-based applications,	11: ((1 1m) - 00 - 11 - 1 - 0 - 0 - 1		
	Microsoft Office	Using "cloud" to offer wide variety of applications:		
Hosting	Radical innovations Google's wide variety	Google Reader and Personalized Home Page, Google		
	of applications are designed to meet the	Photos, Google calendar, Google Docs and other		
	needs of emerging customers and markets			

Thus, first research question has been answered. Building on empirical case study data of contextually ambidextrous organization like Google, authors described Google idiosyncratic characteristics and explained how their mode of knowledge transmission between exploratory and exploitative domains, serves to generate a micro foundation of competitive advantage.

How dynamic capabilities actually operate in Google Inc groups and contribute to its competitive advantage? To answer on the second research question we are taking into consideration the Resource Based View (RBV) on strategy of Google, Inc. It is important to underline that there is a logical linking of RBV view of the company with its dynamic capabilities, because DC is deeply rooted in RBV foundations (Armstrong, Macintosh & Maclean 2012). For dynamic strategy the capabilities are to be dynamic in order to be able to react on industry changes and market dynamism. Changes in technologies, customer preferences, and demand or supply of products and services make current products and services obsolete and therefore require dynamic capabilities. To minimize the threat of obsolescence, Google needs both radical and incremental innovations to satisfy the existing markets and prepare for the emerging markets, therefore by exploitative and explorative

activities, organizations may search information extensively to lessen pressures of uncertainty. Dynamic capabilities enable the Google to react to changing market conditions by developing and renewing its organizational capabilities thereby achieving and sustaining a competitive advantage.

Dynamic capabilities are seen as integrated sets of knowledge management activities that changes, renews and exploits the knowledge-based resources of the firm. Google has proved to be a paradigmatic practitioner of ambidextrous strategic thinking and dynamic capabilities as it has created and transformed a series of markets. Table 2 shows how each of its major product introductions reflected aspects of the major categories of dynamic capabilities and how Google, Inc has pursuit product diversification strategy creating micro foundations of sustained competitive advantages.

Table 2. Micro foundations of dynamic capabilities and sustained competitive advantages at Google.

Strategic decision making on product diversification	Sensing (monitoring and shaping opportunities)	Seizing (analyzing and deciding)	Transforming (implementation of assets re-orchestration)	Result: (creating micro foundations of sustained competitive advantages)
Web search	Algorithms for indexing webpages displaying search results were not effective	Created efficient and meaningful search algorithm for web search	Created API for incorporating search in separate websites and mobile platforms. Expanded search algorithm to consider location and historical search strings when bringing new search results	Dominating global search engine
AdWords	Online advertising model did not bring value to businesses for the investment required	Created online advertising structure that is based on per- click payment, thus dramatically increasing value advertisers get for using the service	Introduced Adwords Web tools for advertisers to be able to analyze the effectiveness and results of their advertising efforts with Google services	One of the leading online advertising providers. One of the main revenue generating streams among product portfolio
E-mail	Free mailbox providers lacked user friendly interface and comfortable allowed size of the mailbox	Create online mailbox has the largest free of charge memory offering and service is extensively focused on friendly used interface	Created advanced filters to remove any SPAM advertising being received and integrated mailbox as online ID for other services provided by Google	Dominating as free-of- charge email mailbox sites
YouTube	Internet video sharing emerged as one of the core activity where people spend time when browsing internet	Purchased and developed online site where people could upload, store and share videos free of charge	Created lists and channels people could subscribe and contribute content transforming the site to a form of social network	Dominating as the absolute leader for online video sharing
Maps	Scanned static maps were becoming available online, however the service lacked functionality of easy browsing	Created web mapping service that provides web based map browsing, route calculations and many other services	Added public transport route planning, street view and API for porting maps on 3rd party websites or applications allowing them to use mapping and location based features	One of the leading online map browsing sites
Cloud Storage	Alternative free-of- charge storage spaces could afford to provide small storage spaces. Lacked interface for document editing	Created Google Docs that focused on developing functionality of document sharing and online editing	Transformed Google docs to Google Drive that added storage facility of other file formats as well as provided API for	Only online storage site that supports online spreadsheet, worksheet editing.

			integrating the service to mobile platforms	
Android OS	Smartphone market boomed, with only few market players. Only iOS could support the functionality	Create open-source mobile OS that supports advanced interface and extensive functionality and which smartphone manufactures could use on their devices	Developed OS for tablet devices	Leading OS on which the currently marketed smart phones operate
Picasa	Photo sharing sites lacked friendly user interface and integration with other online activities	Create online photo sharing webpage that would allow to store unlimited number of photos free of charge	Integrated service with Android OS	Photo sharing site integrated with most of other Google products, especially Android platform

5. Conclusions

Sustainable development, covering economic, social and environmental development, is gaining the increasing significance in the modern changing world (Belevičienė & Bilevičiūtė 2015). The proposed research has not only contributed to the theoretical development of the ambidextrous strategic thinking and dynamic capabilities perspective but also provide decision making pattern for practitioners striving for their sustainable future and retaining competitive advantages in dynamic global ICT battles. The research questions are answered empirically by using data from research-intensive firm as Google. A case study was conducted by analyzing Google as a large research-intensive organization and demonstrated *how* dynamic capabilities shaped *in ambidextrous organization*. Ambidextrous strategic thinking of Google is the key dynamic capability to become something more than a search engine and web storage. Google has the necessary market share and enough resources, but having acquired Motorola Mobility and it faced the challenge to build up credibility as a true ICT company with tangible products like mobile phone. The key policy here seemed to be confidence in exploitation of R&D and in exploration to develop and buy new capabilities as an infrastructure service and tangible product provider.

Dynamic capability of sensing is an inherently entrepreneurial set of capabilities that involves exploring technological opportunities, probing markets, and listening to customers. Google is sensing opportunities and following the learned wisdom that in technological changes it needs to be able to manage all the required technologies. Seizing capabilities of Google include designing business models to satisfy customers and capture value. Google's business model of reducing competition is to give services for free. Revenue is primarily created by online advertising. However, it can be noticed again that the acquisition of Motorola Mobility had marked a radical shift for Google's business model: away from the pure software side of things that they've always dealt in and towards plastic and metal hardware. *Transforming* or *reconfiguration* capabilities as a key *element of dynamic capabilities theory* were most obviously needed when radical new opportunities are to be addressed (Girod & Whittington 2012). Google is an expert in web environment, but mobile devices and mobile environment was a new area for them. Had Google been able to create a credible image as a company that can make money other ways than advertising and giving everything else out free?

The author is going to make a longitudinal study on current topic because it would be meaningful form a managerial and an academic outlook. The idea around the fact that dynamic capabilities lead to competitive advantage needs to be elaborated on from a conceptual viewpoint. It would be great to see more empirical work on *how* dynamic capabilities operate and contribute to micro foundations of competitive advantage within organizations – it is clearly an area that needs further attention in the strategic management and innovation areas.

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References

Journal articles:

Akona, D.: Goodman, P.; Lawrence, B.; Tushman, M. L. 2001. Time: A New Research Lens, *Academy of Management Review* 26 (4): 64-663.

Barr, P.; Stimpert, J.L.; Huff, A.S. 1992. Cognitive change, strategic action, and organizational renewal, *Strategic Management Journal*, *John Wiley & Sons Ltd* 13(S1): 15-36.

Belevičienė, T & Bilevičiūtė, E. 2015. Influence of employment on etrategy of eustainable development implementation, *Journal of Security and Sustainability Issues* 4(3): 520-535. DOI: http://dx.doi.org/10.9770/jssi.2015.4.3(3)8

Benner, M.J.; Tushman, M.L. 2003. Exploitation, exploration, and process management: The productivity dilemma revisited, *Academy of Management Review* 28:238-256.

Danneels, E. 2002. The Dynamic of the Product Innovation and Firm Competence, *Strategic Management Journal*, John *Wiley & Sons Ltd*, 23: 1095-1121.

Duncan, R. 1976. The Ambidextrous Organization: Designing Dual Structures for Innovation, *The Management of Organization. New York: North Holland:* 167-188.

Eisenhardt, K.M.; Graebner, M.E. 2007. Theory building from cases: Opportunities and challenges, *Academy of Management Journal* 50 (1): 25-32.

Eisenhardt, K.M.; Martin, J.A. 2000. Dynamic capabilities: What are they? *The Strategic Management Journal, John Wiley & Sons Ltd*, 21(10-11): 1105-1121.

Edelman, B.; Eisemann T.R. 2010. Google Inc., Harvard Business School Publication 1-10.

Gibson, C.; Birkinshaw, J. 2004. Building Ambidexterity into Organization. MIT Sloan Review Management 47-55.

Hodgkinson, G. P.; Healey, M.P. 2011. Psychological foundations of dynamic capabilities: Reflexion and reflection in strategic management. *Strategic Management Journal*, *John Wiley & Sons Ltd*, 32: 1500-1516.

Ilinitch, A.Y.; D'Aveni, R.A.; Lewin, A.Y. 1996. New Organizational Forms and Strategies for Managing in Hypercompetitive Environments. *Organization Science* 7 (3), *Special Issue Part 1 of 2: Hypercompetition*, 211-220.

Rezk, M. R. A.; Ibrahim, H., H.; Tvaronavičienė, M.; Sakr, M. M., Piccinetti, L. 2015. Measuring innovations in Egypt: case of industry, *Entrepreneurship and Sustainability Issues* 3(1): 47-55. DOI: http://dx.doi.org/10.9770/jesi.2015.3.1(4)

Siggelkow, N. 2007. Persuasion with case studies, Academy of Management Journal 50 (1): 20-24.

Teece, D.J. 2011. Dynamic Capabilities: Guide for Managers, *Ivey Business Journal*, Available on the Internet:http://iveybusinessjournal.com/publication/dynamic-capabilities-a-guide-for-managers.

Teece, D. J. 2007. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance, *Strategic Management Journal*, *John Wiley & Sons Ltd* 28(13): 1319-1350.

Tushman, M.L.; O'Reilly III, C.A. 1996. Ambidextrous Organizations: Managing Evolutionary and Revolutionary Change, *California Management Review* 38(4): 8 - 29.

Wahl, M.; Prause, G. 2013. Toward understanding resources, competencies, and capabilities: business model generation approach, *Entrepreneurship and Sustainability Issues* 1(2): 67–80). DOI: http://dx.doi.org/10.9770/jesi.2013.1.2(1)

Doctoral thesis:

Jansen, J., 2005. *Ambidextrous organization: A Multiple-level study of absorptive capacity, exploratory and explotative innovation*. PhD thesis, Esarmus Research Institute of Management (ERIM), Erasmus University Rotterdam, 1-184.

Papers presented at a meeting or conference:

Girod, S.; Whittington, R., 2012. Dynamic capabilities and reconfigurations: how much is too much? *Strategic Management Society 32 Annual Conference*: Abstracts of SMS 32 Annual Conference, 143.

Armstrong, K.; Macintosh, R.; Maclean, D., 2012. Unblocking the Conceptual Log Jam: Using a Rules Perspective to Make Sense of Dynamic Capabilities. *Strategic Management Society 32 Annual Conference*: Abstracts of SMS 32 Annual Conference, 68.

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