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COMPETITIVE PRIORITIES IN OPERATIONS AND TECHNOLOGY MANAGEMENT: LITERATURE REVIEW

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Abstract: These days an ability of a company to achieve operational excellence in multiple priorities is considered by researchers and practitioners as a source of company's competitive advantage. However, the current state of knowledge does not have a consensus on how competitive priorities emphasis can be achieved. This paper is devoted to the literature review analysis on the topic of competitive priorities and their role in operations strategy and business performance. The analysis was based on the articles published in top-tier journals in Operations and Technology Management field during 1969-2015. On the basis of this analysis, the current state of competitive priorities concept in Operations and Technology Management has been described and suggestions for future research have been developed.

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Contents

Introduction and Background

These days an ability of a company to achieve operational excellence in multiple priorities is considered by researchers and practitioners as a source of company's competitive advantage. Cost, quality, flexibility and delivery are the most common competitive priorities studied in the literature. Initially the concept of priorities has been developed in the context of manufacturing companies. Presently priorities are considered in the context of both service and manufacturing companies. But there is still a lack of generalizability of the results in the area of competitive priorities studies since most of the research is based either on case studies or rather small survey samples (Boyer et al. 2002, Swink and Way,1995).

With this literature review we would like to address the issue of competitive priorities and their interrelations with companies' innovation activities, as well as to investigate the phenomenon in the context of global and emerging markets. To achieve this goal the following tasks need to be completed:

- to identify the role of competitive priorities construct in operations strategy;
- to investigate the innovation component within the sample of literature.

Foundations of focused factory and sand cone model

Two historically contradictory approaches in studying competitive priorities in operations strategy are trade-off and cumulative models. *Trade-off* model has been established by Skinner 1969 (see also Hayes & Wheelright 1984, Garvin 1993). The idea of priorities came with work of Skinner (1969, 1974) who argued that a company in order to be successful needs to be focused at one of the competitive priorities. Competitive priorities represent a link between functional strategies and corporate strategy (Wheelwright et al., 1984). Some similarities between competitive priorities focus orientation and Porter's competitive strategies typology has been mentioned by Flynn (1999).

The opposite view claims that multiple priorities can be achieved if they are treated in the pre-specified the sequence (Ferdows and DeMeyer, 1990, Schroeder 2010). And the sequence is the following: quality, delivery, cost, flexibility (Rosenzweig and Roth 2004). Such *cumulative* or *"sand cone"* model assumes that in period of more advanced manufacturing technologies, priorities are seen to be complimentary rather that are exclusive (see Corbett and Van Wassenhove 1993).

To date numerous attempts of empirical approbation in this field are demonstrating contradictory results on whether companies need to be focused on their core priorities or can follow several priorities at the same time. One of the latest literature overviews dedicated to the analysis of empirical validations of one or another approach conducted by Rosenzweig and colleagues (Rosenzweig et al., 2010) have shown that differences in results of testing can be due to the following reasons: focus of the paper on capabilities or priorities, company's proximity to performance frontier, unit of analysis and other factors that can influence cumulative pattern of priorities such as location, industry specificity, business sector, difference of vision between manufacturers and operators, company's operating and asset frontiers proximity (Boyer et al., 2002, Schroeder 2010). Advanced manufacturing technologies can be another reason why for some companies cumulative model is seen as neither desirable nor necessary (Boyer et al., 2002).

One more possible model of priorities interrelations is integration between aforementioned trade-off and cumulative models. *Integrative* model assumes that different facets on operations strategy are studied and tries to link both views (see Hayes and Pisano 1996, Schmenner and Swink 1998, Boyer et al 2002).

Another important aspect in operations strategy literature is devoted to studying *configurations* in operation strategy. It usually includes identification of typologies and taxonomies (among the most well-known in operations management is, for example, Miller and Roth 1994, who identified three groups of strategies: Care Takers, Maketeers, Innovators).

Methodology

Previous more recent *literature overviews* of competitive priorities are dated to 2010 (Rosenzweig et al., 2010) and 1996 (White 1996, Kim 1996). Rosenzweig's et al. (2010) work is related to the systematization of research dedicated to the collection of an evidence for trade-off existence or failure between classical priorities. White's (White 1996) meta-analysis was focused on manufacturing capabilities and their relation to business performance. While Kim et al (1996) devoted their work to study manufacturing strategy operationalization.

For the purpose of current analysis we base our selection procedure on two decisions. Firstly, since investigation of competitive priorities in operations strategy usually requires intersection of two research domains: operations management and strategic management (see Flynn et al 1999), we focus on top-tier journals of Operations and Technology Management and Strategic Management fields. Since we also focus on operations strategy relation to company's innovation activities, we include journals form Innovation domain as well. Journals selection is based on the ABS rating in 2015. Secondly, we focus on the organization-level studies. We have limited our review to a top-tier journal articles omitting books, book chapters and other non-refereed publications since we consider journal articles in top journals can be a representation of "validated knowledge and are likely to have the highest impact on the field)" (Keupp et al., 2014). Theoretical and empirical works published in established influential journals are expected to define new horizons within a frame of inquiry (Furrer et al. 2008, Keupp et al., 2014). Top-tier journals in the areas of operations and technology management, innovation and strategy (A, B – levels in accordance with ABS rating in 2015) selected for the analysis are[1] listed in Table 1.

Table 1

Top-tier journals in Operations and Technology Management, Innovation and Strategy selected for the analysis

Field of studies / Journal Title		
Operations and technology management	**Innovation**	**Strategy**
• Journal of Operations Management • International Journal of Operations & Production Management	• Journal of Product Innovation Management • Research Policy • R&D Management	• Strategic Management Journal • Global Strategy Journal • Long Range Planning • Strategic Organization

[1] JOURNAL OF OPERATIONS MANAGEMENT OR INTERNATIONAL JOURNAL OF OPERATIONS PRODUCTION MANAGEMENT OR PRODUCTION "AND" OPERATIONS MANAGEMENT OR COMPUTERS IN INDUSTRY OR IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT OR INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS OR INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH OR JOURNAL OF SCHEDULING OR JOURNAL OF SUPPLY CHAIN MANAGEMENT OR PRODUCTION PLANNING CONTROL OR SUPPLY CHAIN MANAGEMENT AN INTERNATIONAL JOURNAL OR Journal of Product Innovation Management OR Research Policy OR R&D Management OR Technovation OR Strategic Management Journal OR Global Strategy Journal OR Long Range Planning OR Strategic Organization (Web of Science search)

Field of studies / Journal Title		
Operations and technology management	**Innovation**	**Strategy**
• Production and Operations Management • Computers in Industry (first time in 2015) • IEEE Transactions on Engineering Management • International Journal of Production Economics • International Journal of Production Research • Journal of Scheduling • Journal of Supply Chain Management • Manufacturing and Service Operations Management (not in WoS) • Production Planning and Control • Supply Chain Management: An International Journal	• Technovation	

The identification of relevant papers has been done with the following key words: *"operational priorit*"*, *"competitive priorit*"*, *"manufacturing priorit*"* in the "Topic" area of Web of Science search tool.

Our search on keywords in top-tier journals of Operations Management, Strategic Management and Innovation fields for the timespan 1969-2016 have counted 127 publications. Almost all of the relevant papers belong to the journals of "Operations and Technology Management" group, search in journals of categories "Strategy" and "Innovation" has shown almost no results – 1 relevant paper identified (Alegre-Vidal et al., 2004).

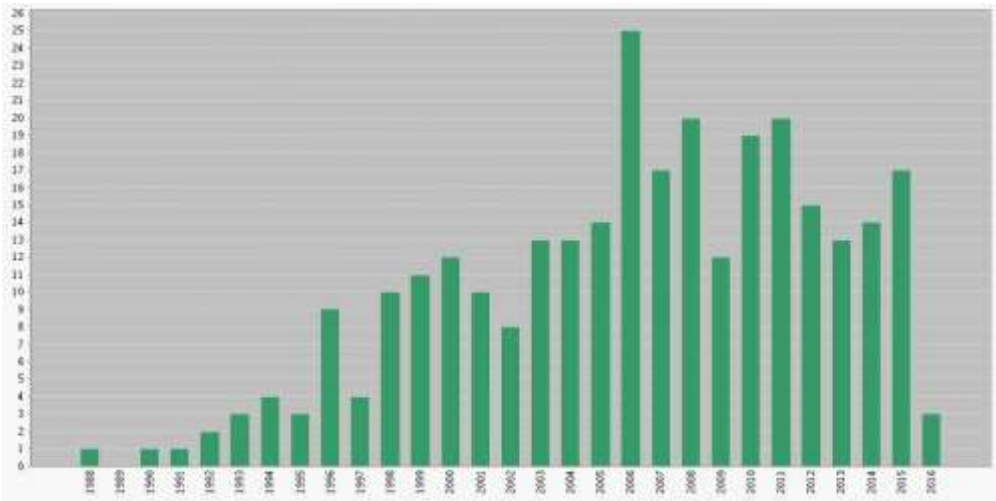

Figure 1. Dynamics of number of publications on the topic of "competitive priorities" for 1969-2016 years in journals indexed by Web of Science[2]

[2] Search query: TOPIC: (("operational priorit*" OR "competitive priorit*" OR "manufacturing priorit"))

Though the number of publication per year is not stable through the years, Fig.1 demonstrates an increase in their number starting from 1992. Such a trend might be connected with an increasing number of empirical investigations in favor of a “sand cone” model or “focused factory” and attempts to find successful combinations as solutions for the achievement of high business performance results. In the beginning these attempts were more focus on theoretical investigations, qualitative data analysis and case study methodology (e.g. Sohal 1996 investigated AMT benefits based on seven case studies), while later more often attempts to analyze quantitative data have been taken (e.g. Lapre et al., 2004 investigated a dataset of 10 U.S. major airlines for 11 years).

Our next step is to identify articles that refer to operations strategy. Within previously identified sample we have checked titles of papers for a “strategy*” keyword. The subsample has counted 41 paper (both operations and manufacturing strategies were considered).

With this literature review we plan to:

1. provide an overview of operations strategy conceptualization in current literature in top-tier journals of Operations and Technology Management, Strategy and Innovation fields;
2. describe a change of groups of competitive priorities studied in the literature with time and methodologies used in these articles;
3. identify potential intersections of operations strategy competitive priorities concept with company’s innovation activities;
4. to suggest future research paths.

Literature Review

Operations Strategy: Priorities, Capabilities, Outcomes

Competitive priorities and corresponding goals identification are considered as first steps in formulation and further implementation of operations strategy. Kim et al., (1996) emphasized that these decisions are important, but need to be followed by action plans for the priorities to be achieved.

As it has been shown by the overview of selected papers, operations strategy includes the following groups of decisions: competitive priorities, structural and infrastructural decision, competitive capabilities. The simplified model presented by Rosenzweig and colleagues (Rosenzweig et al. 2010) is pictured below (Fig.2).

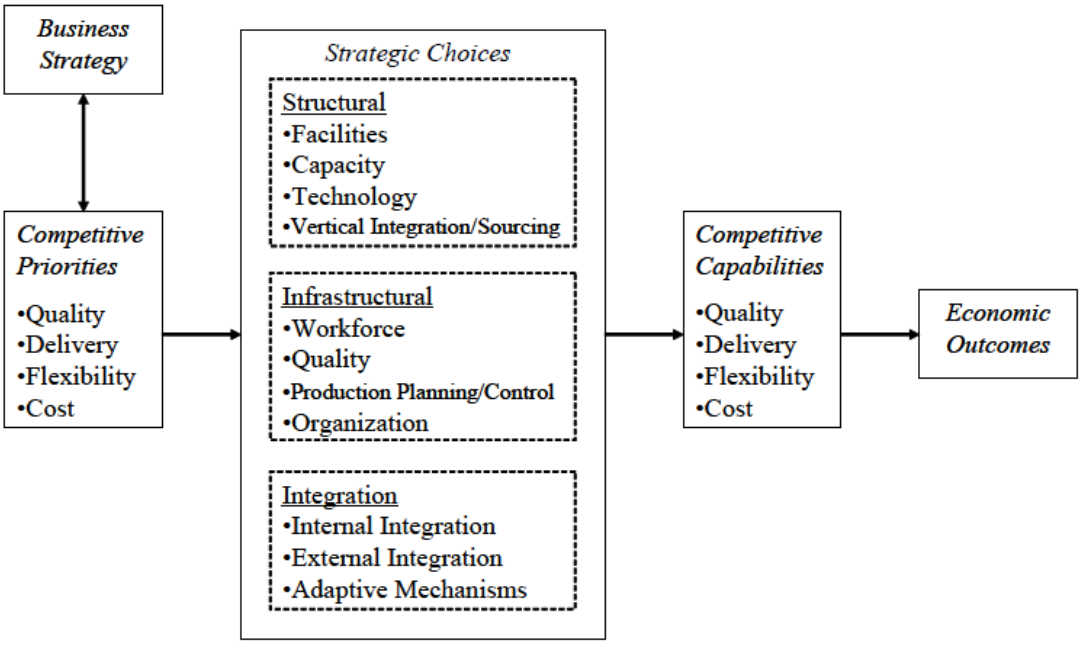

Fig.2. Simplified model of Operations Strategy
[Source: Rosenzweig et al., 2010]

In Table 2 we have provided a concise overview of papers included for the analysis with main variables the paper referred to, competitive priorities it considered, paper and methodologies that were used, and main outcomes of a paper. Table 3 presents where 41 articles selected for the analysis were published. We have also used the coding matrix to create Table 4 and Table 5, where Table 4 lists the type of analysis that each article has adopted, and Table 5 summarizes priorities that were studied in selected papers.

Table 2

Competitive priorities in operations strategy: overview of the selected papers

Authors	**Year**	**Variables of interest**	**Priorities**	**Type**	**Methodology**	**Main outcome**
Kim, JS; Arnold, P	1996	Business strategy-priorities-structural (Capacity Facility Technology Vertical integration) / infrastructural decisions (Workforce Quality Planning and control Organization)	Price, Quality, Delivery, Flexibility	Empirical	EFA, regression	Framework of manufacturing strategy process model proposed.
White, GP	1996	Competitive Capabilities	Cost, Quality, Flexibility, Delivery, Speed	Conceptual	Meta-analysis	Relationships among manufacturing capabilities based on existing empirical investigations presented
Boyer, KK	1998	Structure (Capacity Facilities Technology Vertical Integration) / Infrastructure (Workforce Quality Production Planning Organization)	Cost, Quality, Flexibility, Delivery	Empirical	Correlation	Finds out that investment in AMT is not associated with any of the priorities emphasis. Plant that emphasize flexibility as one of the priorities do not invest in structural or infrastructural improvements to support objective.
Avella, L; Fernandez, E; Vazquez, CJ	1998	Priorities and manufacturing advantages	Efficiency, Flexibility, Quality, Delivery, Customer service	Empirical	Cluster and discriminant analysis	Three alternative strategies have been found based on classification criterion of strength in each of the priorities groups.
Flynn, BB; Schroeder, RG; Flynn, EJ	1999	Employee development, Management technical competence objective, Design for customer needs, Worker participation, Proprietary equipment objective, Continuous improvement, Pull system, JIT supplier relationship, Process control, Feedback of information / Cost, quality performance, quality-features, dependability-specifications, dependability-on-time delivery, dependability-service, product flexibility, volume flexibility	Cost, Quality, Delivery, Flexibility	Empirical	Descriptive statistics, correlation, hierarchical regression analysis	World class manufacturing practices significantly related to cost, quality–performance, product flexibility and volume flexibility. Evidence for synergies between dimensions of competitive priorities has been found.

Kathuria, R	2000	industry membership – priorities - performance (accuracy, quality, productivity, customer satisfaction, efficiency, quantity of work, timeliness)	Cost, Quality, Flexibility, Delivery	Empirical	Cluster analysis	Relatively high emphasis by both levels of managers on quality, compared to the other three competitive priorities, is noteworthy and consistent with the global trends. The emphasis on delivery is a close second. Differences in competitive priorities exist across managerial levels in India.
Boyer, KK; Pagell, M	2000	Competitive priorities, structural investments in AMT, infrastructural investments	Cost, Quality, Flexibility, Delivery	Conceptual	Conceptual	Evidence provided indicating the relationship between conceptualized and intended strategies.
Avella, L; Fernandez, E; Vazquez, CJ	2001	Priorities, structural and infrastructural decision areas / business performance	Cost, Quality, Flexibility, Delivery	Empirical	Regression, discriminant analysis	Manufacturing strategies content characteristics of best performance have not been found.
Dangayach, GS; Deshmukh, SG[a3]	2001	Internal, external analysis / company's antecedents - competitive priorities and improvement activities	Quality, Innovation, Delivery, Flexibility, Cost	Empirical	Case study, cluster analysis	Four strategic groups and their critical success factors and their critical success factors identified: reactive enterprise, neutral enterprise, active enterprise and proactive enterprise based on the importantce of compettive priorities and imporovemnet activities investments
Dangayach, GS; Deshmukh, SG[b4]	2001	Competitive priorities, AMS and AMT, MA and BS alignment, Manufacturing Competence Index (MCI), Business Performance Index (BPI)	Cost, Delivery dependability, Delivery speed, Flexibility, Innovation	Empirical	Cluster analysis	Between groups differences for MCI and BPI groups are reported, MCI and BPI within groups has been found to be highly correlated.
Boyer, KK; Lewis, MW	2002	Competitive priorities by respondent type	Cost, Quality, Flexibility, Delivery	Empirical	Correlations by respondent type	It has been found that despite the AMT potential to foster improvements in quality, delivery, flexibility and cost, at the same time, there is a tendency in of plant within the sample to focus on certain capabilities.

[3]International Journal of Production Research
[4] Production Planning and Control

Olhager, J; Rudberg, M	2002	Market requirements / manufacturing strategy / Manufacturing Planning and Control (MPC) system	Product, Volume, Versatility, Delivery	Coceptual	-	Differences between influences market, product, and process characteristics influence on MPC system has been proposed.
Acur, N; Gertsen, F; Sun, HY; Frick, J	2003	Formalization / business(competitive) objectives / improvement goals / action plans	Price, Product design and quality, Conformance quality, Dependable delivery, Fast delivery, Customer service, Product range, New product frequency, Size flexibility, environment	Empirical	Correlations	Companies with formal strategy competitive priorities, have better alignment between improvement goals and action programs than companies without such a strategy.
Dangayach, GS; Deshmukh, SG	2003	Manufacturing strategy: competitive priorities, / MCI, AMT, AMS, integrated information systems (IIS) (cross industry analysis)	Cost, Quality, Flexibility, Delivery, Innovation	Empirical	EFA, descriptive statistics	Industrial specificities in priorities, manufacturing improvement practices and manufacturing practices identified. Automotive sector has been found to be the most innovative (high innovation rate, faster NPD, continuous improvement).
Zhao, Xiande; Sum, Chee-Chuong; Qi, Yinan; Zhang, Huiying; Lee, Tien-Sheng	2006	Competitive capabilities (emphasis/importance and strength) / financial performance	Price, Flexibility, Quality, Speed, Dependability, Service, Product line	Empirical	Cluster analysis	Taxonomy of manufacturing strategies identified. Taxonomy based on realized strength has been found to better explain company's financial performance compared to priorities emphasis.
Urgal-Gonzalez, Begona; Garcia-Vazquez, Jose Manuel	2007	Structural manufacturing decisions (importance) / competitive priorities (importance)	Price, Product flexibility, Volume flexibility, Delivery, Design quality, Conformance quality	Empirical	SEM	Certain decisions can originate capabilities where the priorities are set.
Nair, Anand; Boulton, William R.	2008	Industry lifecycle, rate of technological change / competitive priorities, structural elements, infrastructural elements	Cost, Quality, Flexibility, Delivery, Innovation	Conceptual	-	Proposed framework can be used by practitioners in their adaptation process to ensure a fit between priorities, structural and infrastructural decisions in order to ensure effective implementation of operations strategy.
Martin-Pena, Maria Luz; Diaz-Garrido, Eloisa	2008	Priorities-based groups, structural, infrastructural decisions, and business performance	Cost, Quality, Flexibility, Service, Environmental protection	Empirical	Cluster analysis	Identified companies with operational excellence (success in all 6 priorities) and manufacturers focused on quality and delivery. Differences in structural, infrastructural decisions and performance investigated,

Kathuria, Ravi; Porth, Stephen J.; Kathuria, N. N.; Kohli, T. K.	2010	Manufacturers' emphasis on priorities	Cost, Flexibility, Quality, Delivery	Empirical	EFA, MANOVA	Relatively high emphasis on quality has been found, then on delivery priority. High emphasis on all four priorities was not supported. Differences of competitive priorities on different managerial levels have been found.
Choudhari, Sanjay C.; Adil, Gajendra K.; Ananthakumar, Usha	2010	Decision areas: production planning and control, human resource, organization structure and control, facilities, sourcing, process technology	Cost, Quality, Delivery, Reliability, Delivery speed, Flexibility, Innovation	Conceptual	-	Based on literature review a framework to study environmental and internal fit with manufacturing decisions has been proposed.
Shavarini, Sohrab Khalili; Salimian, Hossain; Nazemi, Jamshid; Alborzi, Mahmood	2013	Product strategy-types, priorities, business strategy	Cost, Quality, Delivery, Flexibility, Innovation	Empirical	Based on alignment codes	A model to improve company's performance based on operations and business strategy alignment has been proposed.
Rebolledo, Claudia; Jobin, Marie-Helene	2013	10 priorities	Low price, Product quality, Conformance, Delivery dependability, Delivery speed, Broad product line, After-sales service, Frequent innovation, Innovative products, volume flexibility	Empirical	Cluster analysis	Manufacturing strategy-purchasing strategy link investigated, taxonomy based on 10 priorities developed.
Laosirihongthong, Tritos; Prajogo, Daniel I.; Adebanjo, Dotun	2014	Competitive strategy / internal resources (knowledge/creativity) / network resources (customer network, supplier network) / innovation performance (product, process)	Innovation	Empirical	SEM	Differentiation strategy leads to the development of network asset in addition to internal asset. Internal and network resources both mediate the relation of differentiation by innovation strategy to innovation performance.
Kim, Yoon Hee; Sting, Fabian J.; Loch, Christoph H.	2014	Industry and process, competitive priorities, organization structure, size, number of plans	Competitive priorities varieties based on industry	Empirical	Case studies	Integrated process model of operations strategy formation based on top-down planning and bottom-up learning with contingency factor of organization centralization has been proposed

Wang, Qiang; Wang, Zhiqiang; Zhao, Xiande	2015	Customer orientation, competitor orientation, innovation orientation / Customization, knowledge utilization (CKU) / Mass customization (MC) capability	Customer orientation, Competitor orientation, Innovation orientation	Empirical	SEM	Firms' strategic orientations (customer, competitor, innovation) directly contribute to MC capability and positively affect CKU which improves MC capability.
Longoni, Annachiara; Cagliano, Raffaella	2015	Price-orientation, market-orientation (product), market-orientation (service), capability-orientation configurations / Operational performance	Environmental and social sustainability	Empirical	Cluster analysis, ANOVA, EFA	Market- oriented and capability-oriented operations strageies are complemented by environmental and social sustainability priorities. They are adopted by companies with a differentiation and innovation business strategies. Capability oriented and committed to environment and sustainability perform better in a long and short terms.
Alves Filho, Alceu Gomes; Nogueira, Edemilson; Gomes Bento, Paulo Eduardo	2015	Competitive priorities, decision areas and main actions	Quality, Delivery, Cost, Mix Flexibility, Volume Flexibility	Empirical	Case studies	Competitive priorities and decision areas are found to be highly interrelated systems and significant changes of operations strategy requires significant investments, effort and time.
Chatha, K. A.; Butt, I.	2015	Manufacturing capabilities (MCs), strategic choices (SCs) areas covered	Cost, Quality, Flexibility, Delivery, Servicing, Innovation, Social and Environmental Perspective	Conceptual	-	MS literature shows investigation of cost, quality, flexibility, and delivery competitive priorities as most widely investigated. Firms pursue multiple manufacturing priorities simultaneously. Flexibility is the most researched competitive priority. Service, innovation, and solution orientation have not been studied as competitive priorities. Growing evidence in the literature of the cumulative capabilities theory has been demonstrated.

Chen, Yen-Tsang; Dultra-de-Lima, Ronaldo Gomes; Csillag, Joao Mario; Tiomatsu Oyadomari, Jose Carlos	2015	Performance / competitive orientations / capability (price-oriented, innovation-oriented, operation-oriented groups of companies)	Price, Innovation, Operation	Empirical	Cluster, ANOVA, regression	Three groups have been identified: "Operation oriented," "Price + Operation oriented" and "Price + Operation + Innovation oriented."

Table 3

Number of articles included into analysis by journal source

Journal	**Number of papers**
INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	18
INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH	9
JOURNAL OF OPERATIONS MANAGEMENT	8
INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	3
PRODUCTION PLANNING & CONTROL	2
PRODUCTION AND OPERATIONS MANAGEMENT	1

Table 4

Types of analysis used in empirical articles (out of 41 selected for the analysis)

Method	**Number of times method was used**
Cluster analysis	10
Correlation	6
FA: EFA, CFA	6
Regression	5
Case study	4
ANOVA, MANOVA	3
SEM	3
Descriptive statistics	2

Traditional groups of priorities in operations strategy literature include: quality, delivery, cost, flexibility (Boyer et al. 2002, Flynn et al., 1999, Kathuria 2000, Boyer et al 2000, Boyer et al 1998, Avella et al 2001, Kathuria et al 2010, Boyer et al 1999, Das 2001, Oltra et al 2005). Recently groups of factors that depict innovation priority (Ward et al. 1990, Dangayakh 2001[a], 2001[b], 2003, Nair et al 2008, Shavarini 2013, Laosirihongthong et al 2014, Wang et al, 2015) and environment (Longoni 2015, Martin-Pena et al., 2008, Acur et al., 2003) have started to be taken into account as well. Table 4 demonstrates an extension of priorities variety from traditional cost, quality, flexibility, and delivery to customization, environmental priority, innovation and investigation of different types of a same priority group (e.g. Das 2001).

Table 5

Types of priorities studied in selected for the analysis 41 articles

Priority name	Number of times a priority was mentioned
quality	27
flexibility	27
delivery	26
cost	21
innovation	12
price	7
environment	4
service	4
speed	3
dependability	2
product	2
versatility	2
volume	1
customer satisfaction	1
product range	1
efficiency	1

From analyzed articles we have concluded that there is no single pattern for competitive priorities emphasis in companies. Moreover, since a majority of articles were focused on finding successful combinations (Table 2), it can be concluded that patterns of emphasized priorities are contingent on various factors – both internal (strategic) and external (industrial).

Most of the papers fit a general structure of operations strategy that includes competitive priorities, structural and infrastructural decisions. As an outcome of realized operations strategy can be seen business performance (Boyer et al 1999, Avella et al., 2011), unit's performance (Joshi et al. 2003), innovation performance (Laosirihongthong et al., 2014) (Table 6).

Table 6

Types of independent and dependent variables used in empirical articles (out of 41 selected for the analysis)

Independent variable	**Number of times used**
Industry	**4**
industry membership	1
market requirements	1

Independent variable	Number of times used
industry lifecycle / rate of technological change	1
internal, external analysis / company's antecedents	1
Strategy	**3**
business/competitive strategy	2
customer orientation / competitor orientation / innovation orientation	1
Priorities/Importance	**3**
structural manufacturing decisions (importance)	1
GM's perception of priorities / MM's perception of priorities[5]	1
strategic priorities	1
Other	**1**
purchasing competetnce / AMT	1
Dependent variable	**Number of times used**
operations performance (capabilitites)	3
operations strategy (priorities, structural and infrastructural decisions)	3
other	2
business performance	1
innovation performance	1

As we have mentioned earlier, papers in our analysis can have in their focus as competitive priorities (Acur et al. 2003, Nair et al 2008, Urgal-Gonzale et al 2007, Dangayakh et al 2001 and others), so competitive capabilities (Zhao et al 2006, Flynn et al 1999). Since competitive priorities are more commonly seen as company's goal-orientation, while competitive capabilities is mostly a result of actions a company take in order to achieve the outlined goals. There is a need to differentiate the results between priorities and capabilities (Rosenzweig et al., 2010) when referring to priorities concept. Boyer and colleagues research (Boyer et al. 2002) results based on their transformation procedures and simulation suggest that trade-off exist despite the advanced manufacturing technology (AMT) that can be used by companies to foster improvements in all the priorities set. They emphasize that it is a very important for the priorities to be translated to the capabilities for a company's success. Thus, competitive priorities construct can identify operational goals, strategic choices or be a measure of operational capabilities.

One of the important factors that influence the differences in models (trade-off vs. cumulative) is a proximity of a company to asset and productivity frontiers (Boyer et al. 2002, Rosenzweig et al. 2010). Where an asset frontier is the "maximum performance possible based on plant's structure (i.e. physical investments), while operating frontier denotes the performance made possible by infrastructural choices (i.e. operating policies), given as a set of assets" (Boyer et al., 2002).

Operations Strategy Linkage to Business Performance

Moderating effects in studied sample of operations strategy literature are rather poorly represented, while mediation can be found quite often. It might be due to the fact that competitive priorities as goal-orientations are frequently assumed as a link from business strategy orientation to concrete actions in companies' operations (Acur et al., 2003, Boyer et al., 2002, Kim et al., 1996). Another widely represented section in operations strategy is configurations research (Kathuria 2000, Zhao et al. 2006, Dangayach et al., 2001, Martin-Pena et al., 2008, Avella et al., 1998 and others). It includes a question of strategic fit of internal and external variables and is mostly devoted to taxonomies and typologies development (Choudhari et al 2010). Competitive priorities are usually considered as one of the main building blocks in

[5] GM – General Manager, MM – Manufacturing Manager

manufacturing strategy (Dangayackh et al., 2010: Skinner 1969; Hayes and Wheelwright 1984; Hill 1987; Gerwin 1993) and their external and internal fit is of special importance for operations strategy success as well as for overall business performance.

The results of implemented operations strategy are usually found to have an influence on its business performance (Boyer et al 1999, Avella et al., 2011). There are several ways for measuring business performance represented in selected articles: through business performance index (BPI) (that consists of export, profit trends, and market share (Dangayach et al, 2001) and measures of sales increase, profits increase, ROA and productivity in their measurements (Martin-Pena et al., 2008, Kathuria, 2000, Kathuria and Porth 2003, Kim and Arnold, 1992). But it is not only competitive priorities that lead to business performance, but also competitive capabilities (Boyer et al., 2002, Laosirihongthong et al 2014).

Summarizing, the analysis of selected 41 articles have demonstrated the following aspects:

1. operations strategy is often seen as a consisting of operations priorities, structural and infrastructural decisions;
2. operations strategy as shown by the publications, can be dependent on the following factors: competitive strategy, business strategy, market requirements, industry, and variables: operations performance, innovation performance (in case of indicating "innovation" as a priority), business performance are seen as an outcomes of it;
3. one of the most popular areas of interest is research on configurations that is aimed to identify the fit between decisions within operations strategy, between operations strategy and its environment, and an identification of the most effective patterns of operations strategies by establishing typologies and taxonomies;
4. the diversity of methodologies used in the papers spread from case studies, cluster analysis in finding configurations to correlation, regression, ANOVA and structural equation modelling types of analysis.

Competitive Priorities and Innovation

Innovation as a group can be identified by new product investments (Dangayach et al., 2001), number of new products, or NPD speed. The analysis of the selected articles demonstrates that there is an emphasis of a strong need for innovations to be included as one of the priorities of companies especially in a context of industry growth and technology change (see Nair et al., 2008). As it has been shown by Dangayach et al. (2001) innovators group has the highest industry average level of Business Performance Index that can be related to an indicated higher level of alignment between business strategy and manufacturing strategy.

Advanced manufacturing technology (AMT) or advanced management systems (AMS) (Dangayach et al., 2001) are found among the factors that might influence an ability of a company to proceed with one or another scheme of priorities emphasis. They allow company to be successful in achievement of multiple competitive priorities (Boyer et al 2002). Boyer et al. (2002) suggest that one of the main ideas of operations strategy is transformation of operational priorities into operational capabilities. As a result, for example, flexibility competitive priority can be achieved through the technological innovations and constant development (Avella et al., 1998). While cost-oriented operations strategies usually show low or medium technology–level projects and innovation-oriented is mostly referred to R&D-oriented companies (Oltra et al 2005). Innovation activities can affect the manufacturing process through new innovative processes in a company, such as, for example, lean production and agile manufacturing (Rebolledo et al., 2015, Narasimhan et al., 2006, Bozarth et al., 1998). For the newest competitive priorities groups as environmental and social sustainability priorities (Longoni et al., 2015) innovation can be performed as organizational or technological. One of the results demonstrated by Laosirihongthong et al. (2014) is that innovation in order to lead to positive innovation performance results needs to be explicit and emphasized by company's competitive strategy. Network and internal resources have also been suggested to play a great role in

achieving innovation performance of companies since competitive orientation does not lead to innovation performance by itself (Laosirihongthong et al., 2014).

There are studies that underline environmental dynamism and complexity among external factors of innovation-oriented operations strategy (e.g. Nair et al., 2008). They also mention that recent research in innovation and strategy fields identifies dimensions that allow innovation to be included in competitive priorities alongside with other priorities (Nair et al. 2008). In Miller and Roth (1994) paper they have identified three types of companies based on competitive capabilities: caretakers, marketeers and innovators. They have also mentioned similarities of these clusters with Miles and Snow (1978) types of business strategies. Nair and Boulton (Nair et al., 2008) did not investigate the sequence of the priorities, but conceptualized the dependence of innovation-oriented operations strategies from innovation ecosystem point of view (by describing possible matches of ecosystem and strategic characteristics of companies in transition from mature and relatively stable industries to growing and technologically dynamic).

Competitive Priorities: Emerging Markets Context

Emerging market context has been taken more interest from scholars in recent decades. Since now for manufacturers it became possible to produce high-quality products at low cost despite their location, a growing competition from companies of emerging markets can be seen as a major stimulus for manufacturing strategies investigation (Kathuria et al., 2010).

Regarding the taxonomies research, studies within emerging markets context have shown different results. For example Zhao et al. (2006) analysis has not identified the same strategic clusters among Chinese manufacturing companies that was established for 164 American manufacturing units by Miller and Roth in 1994 (Miller and Roth, 1994). As well as in the context of Indian manufacturers high emphasis on all four competitive priorities was not supported (Kathuria et al. 2010). Indian manufacturing companies has found to innovate and commercialize innovation in a timely and costly manner in order to exploit arising opportunities globally (Dangayakh et al. 2003). Laosirihongtong et al. (2014) suggest that innovation priority is one of the particular interests for studying within the developing economies context since these economies role in global trade and manufacturing is increasing.

Discussion

Conducted literature review has identified that competitive priorities concept in top-tier journals of Operations and Technology Management field from 1969 to the beginning of 2016 have been investigated within the following main issues:

- two possible approaches of studying innovations in a context of operations management literature: as a separate priority and as a method to achieve other priorities;
- one of the popular research patterns of investigation is an alignment of priorities into clusters to identify successful patterns of operations strategies;
- priorities are studied as a part of an operations strategy followed by structural and infrastructural decisions within strategy;
- competitive priorities from capabilities view are usually studied with the following groups of antecedents: AMT, industry, world class manufacturing practices;
- at the same time competitive priorities as companies' goal-orientation are usually considered as antecedents to other operations strategy-related components: structural (such as capacity, facilities, technology, vertical Integration) and infrastructural (such as workforce, quality, production, planning, organization decisions);
- as it was suggested by Boyer et al. (2002) one of the main tasks of operations strategy is to make operations priorities to become operations capabilities. As literature analysis has shown innovation and innovation capabilities (as well as improvement capabilities) can be seen as one of the main factors of emphasized priorities achievement.

The strategic choice in innovation activities of a company is very important as it is not only required to formulate operations priorities in accordance with management perception and their vision of main goals for the next years, but to plan innovation activities accordingly in order to support the operations.

Conclusions

Research in the area of competitive priorities demonstrated some mixed results. Firstly, it has been shown that a model of positioning priorities depends on the level of analysis, on priorities place (e.g. goals vs. capabilities). More recent research results, however, have indicated the need to include extended priorities groups (e.g. innovation, environment, sustainability) and to include into consideration factors that might influence the model, sequence and results of competitive priorities. Since newer groups for competitive priorities emerge (first innovation, then environment and social sustainability), their empirical validation and testing in different context might be seen as one of the future research dimensions.

Two alternative types of company's behavior that consider innovation as an instrument to compete have been identified. In first case innovation can be one of the competitive priorities of a company. In second innovation can be a tool to achieve emphasized competitive priorities.

Studying competitive priorities of emerging economies, especially of Russian companies, is of the issues of a particular interest. Indeed, as it is was indicated in PWC Global Innovation Survey held in 2013[6], these days managers consider innovation and operational excellence as going together: "…in this challenging economic climate, where many companies still face enormous pressures to reduce costs and become more efficient, many executives are telling us they see innovation on a par with operational effectiveness." In current economic conditions, the issue of achieving operational excellence is even more important. For these reasons studying interconnections of operation and innovation activities can provide promising results in better management of these functional areas and competitive advantage achievement.

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[6] http://www.pwc.com/gx/en/issues/innovation/innovation-survey.html

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Appendix

List of Acronyms:

AMS	Advanced management systems
AMT	Advanced manufacturing technology
BPI	Business performance index
IIS	Integrated information systems
MCI	Manufacturing competence ndex
OS	Operations strategy