Barriers and Success Factors of Performance Management in International Manufacturing Networks – A Literature Review

Dominik Remling

Abstract: This study systematically profiles the International Manufacturing Network research literature on the topic of Performance Management and provides a research framework addressing the core debated topics. The findings reveal that the main barriers are the heterogeneity of manufacturing sites, the implementation, and the gap between site- and network-level. The main success factors are the inclusion of diverse types of metrics for a wide range of areas, following guidelines for the implementation, engaging skilled employees, and continuously adapting the system over time. Alongside the identification of the core debated topics, a research agenda is proposed and managerial implications are highlighted.

Keywords: International Manufacturing Network, Global Production Network, Global Manufacturing Network, Performance Management, Performance Measurement, Management Control

Barrieren und Erfolgsfaktoren von Performance Management in globalen Produktionsnetzwerken – Eine Literaturrecherche

Zusammenfassung: Internationale Fertigungsnetzwerke, Globale Produktionsnetzwerke, Performance Management, Leistungsmanagement, Leistungsmessung, Unternehmenssteuerung

Stichwörter: Diese Studie untersucht den Forschungsstrom International Manufacturing Networks zum Thema Performance Management und liefert einen Untersuchungsrahmen, der die debattierten Kernthemen aufgreift. Die Ergebnisse zeigen, dass die Hauptbarrieren die Heterogenität der Fertigungsstandorte, die Implementierung und die Diskrepanz zwischen Standort- und Netzwerkebene sind. Die identifizierten Erfolgsfaktoren skizzieren, verschiedene Arten von Metriken für eine Vielzahl von Bereichen einzubeziehen, Richtlinien für die Implementierung zu befolgen, qualifizierte Mitarbeiter zu involvieren und das System im Laufe der Zeit kontinuierlich anzupassen. Neben der Identifizierung der diskutierten Kernthemen, wird eine Forschungsagenda vorgeschlagen und Implikationen für das Management aufgezeigt.

1. Introduction

The International Manufacturing Network (IMN) field has continuously grown in significance as a result of the internationalization of manufacturing companies (*Cheng et al.* 2015). However, this international perspective of the Operations Management (OM) research area is addressed by relatively few researchers due to its high complexity and the unsuitability of analytical models (*Ferdows* 2018). Next to OM, the research field of Performance Management (PM) has gained attention in recent years and offers a range of theories and approaches *(Goshu/Kitaw 2017; Taticchi /Balachandran* 2008; *Yadav/Sagar* 2013). Recently, PM was frequently addressed in the context of multinational companies (*Sageder/Feldbauer-Durstmüller* 2019).

In their seminal work, *Neely et al.* (1997) recognized the need for PM in manufacturing very early on. The topic of "performance review" has also already been presented within the IMN research stream by *Shi/Gregory* (1998) as a critical element in their manufacturing model but has, until the contribution of *Costa Ferreira Junior/Fleury* (2018), only scarcely been taken up by the research community (Cheng et al. 2015; Goshu/Kitaw 2017; Mancini/Piscitelli 2018; *Sager et al.* 2016). This research gap is highlighted by *Mancini/Piscitelli* (2018, p. 87) with their statement "little attention has been given to the issue of performance measurement in a network context," although the two topics have been clearly advanced in their own right. Thus, PM is particularly noteworthy among the neglected topics in the IMN literature.

Over time, IMN authors have repeatedly mentioned the growing demand for PM (*Chatha/Butt* 2015; *Cheng et al.* 2015; *Sager et al.* 2016). However, *Chatha/Butt* (2015) stated back in 2015 that PM only accounts for 2 % of the literature in the manufacturing strategy research stream. Although a reference value for the literature published after 2015 cannot be provided in this article, significantly more research gaps than specific approaches were encountered in this systematic literature review (SLR). The existing fundamental and holistic PM models for IMNs have not yet been developed and still leave open questions *(Costa Ferreira Junior/Fleury* 2018; *Sager et al.* 2016). Thus, the article aims to address the need for conceptual and procedural models to guide researchers and practitioners.

As some models already exist for specific areas (for example, supply chain or quality management), there is a need to map these models as a holistic system (*Goshu/Kitaw* 2017). The holistic mapping requires the integration of all entities along the value chain, including its conflicting interests (*Goshu /Kitaw* 2017). The approach of linking multiple management disciplines in the context of PM is also supported by *Castellano et al.* (2018). For this, *Mancini/Piscitelli* (2018) discovered that the nature of partners, relationships, and shared resources need to be considered in the design of a Performance Management System (PMS). *Pashaei/Olhager* (2019) also explicitly call for more research to investigate the multidimensional nature of IMNs.

Holistic models that enable a consistent PMS at the site level create opportunities for the sites in a network (*Arellano et al.* 2019). However, from an IMN perspective, there are still gaps in dealing with the heterogeneity of sites (*Reuter et al.* 2016) and identifying which performance dimensions are helpful to guide the behavior of site managers (*Wiech/Friedli* 2020). Further, the relationship between site- and network-level is not sufficiently explored in the PM context (*Demeter* 2014; *Thomas et al.* 2015). The contributions by *Mediavilla et al.* (2015) as well as *Wiech/Friedli* (2020) clearly show the divergence of opinions and interests between site- and network-level. *Eisenhardt* (1989) has described the principal-agent problem in this context, which serves as a useful theory. Lastly, the gap in operationalizing existing constructs and models from the IMN area is worth mentioning, as has been done by *Mediavilla et al.* (2015) for the site role concept. The purpose of their study was to deploy the operationalization as an improvement roadmap that ultimately can represent a PMS.

Although several gaps are highlighted, the subject is not a black box at all from a scientific viewpoint. Various authors name specific barriers, success factors, approaches, and practices that should be considered in the context of PM. Thus, this study intends to comprehensively profile the IMN research literature in terms of PM. From a practitioner viewpoint, the increased competition through internationalization requires a faster supply of appropriate information for decision making *(Schläfke et al.* 2012). Primarily, companies operating in competitive solid environments should adapt PM as a tool to improve performance (*Flaeschner et al.* 2020). This seems to be widely recognized in practice, as according to a recent study, 72 % of 88 surveyed companies agree to use a PMS at site- and network-level (*Friedli et al.* 2020).

In the following, the methodology used for the SLR is explained followed by the literature categorization. The results are discussed afterward , which includes presenting the research agenda and highlighting managerial implications.

2. Methodology

A SLR was conducted following the approach by *Onwuegbuzie/Frels* (2016). The exact steps of this approach are shown in Figure 1. The process sets off with an exploration phase through the following first step: Exploring beliefs and topics. In addition to the critical examination of the researcher's belief system and research stance, a problem statement and a working title were derived. The problem statement is defined as followed: A large share of companies fail to steer their IMNs using PM from a network perspective. The second step, "Initiating the Search," involves identifying relevant databases. In line with *Onwuegbuzie/Frels* (2016), multi-, inter- and transdisciplinary databases are included. For this SLR, five disciplinary databases were identified: EBSCOhost & Scopus (multidisciplinary), Emerald & ScienceDirect (interdisciplinary), ProQuest (transdisciplinary). After the identification of the databases, an initial search was started. The following keywords were generated for the initial search: ("International Manufacturing Network*" OR "Global Production Network*" OR "Global Manufacturing Network*") AND ("Performance Management" OR "Performance Measurement" OR "Management Control"). The subsequent further refinements were applied in all databases: Language: English; Period: 1990 to present; Search in: Abstract, Title, Key/ Subject Terms; Quality: Scholarly (Peer Reviewed).

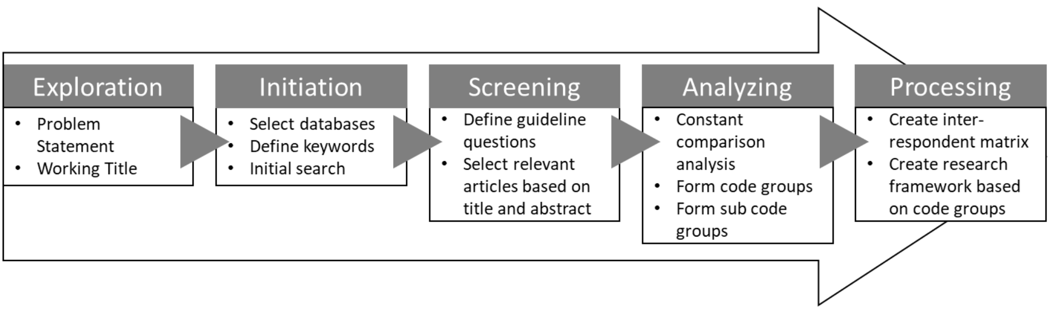

Figure 1: Systematic literature review process.

The search returned 630 hits (EBSCOhost: 7, Scopus: 228, Emerald: 197, ScienceDirect: 52, ProQuest: 146). Some hits could initially be filtered out based on the title. For all other hits, the abstract was read in its entirety by the researcher. The following two guideline questions helped to decide whether a publication could be classified as relevant or not.:

- Does the article explicitly refer to IMNs according to the conventional definition of *Ferdows* (1989)?
- Does the article explicitly mention performance measurement/management systems or their subsystems (e.g. performance assessment) and/or indicate their necessity?

The screening step revealed 42 relevant articles. Based on an in-depth analysis of the 42 identified articles, seven articles were found not to be relevant. An additional twelve articles were identified by backward search and three more by a forward search. These articles were also analyzed and encoded, and four turned out not to be relevant. In total, 46 relevant publications were identified and analyzed.

A computer-assisted qualitative data analysis software was used (cf. ATLAS.ti Scientific Software Development GmbH 2020) to perform the in-depth analysis of all identified articles. Methodically, the constant comparison analysis was applied (cf. *Glaser/Strauss* 2009; *Onwuegbuzie et al.* 2012). Using this method, individual sections, paragraphs and sentences were labeled with codes. This procedure conforms to the open coding process, which stems from grounded theory *(Flick* 2009). Subsequently, code groups were created by attaching codes to citations with cluster topics. The following guideline questions supported the process:

- In which context is the subject of PM in IMNs addressed?
- Are tangible concepts, applications, or demands outlined?

During the analysis, 42 codes were generated. These codes were clustered into four code groups. Each code group was examined in an individual network[1] to form sub-code groups. The analyzed articles and developed code groups can be found in Table 1.

3. Literature Categorization

First, the identified articles were categorized by journals to ensure coverage of the leading OM journals. To do so, the results of the comprehensive SLRs in the IMN research field by *Cheng et al.* (2015) and *De Toni/Parussini* (2010) were taken as a guide. As shown in Table 1, nine journals were covered by all three SLRs. Three journals were covered by this SLR and one of the two former SLRs. This SLR provided an additional four journals that were not covered by the two former SLRs. Eleven journals were not covered by this SLR that were identified by the two former SLRs. This can be explained by the fact that the two earlier SLRs covered a much broader scope and identified only a small number of relevant papers in these journals. Consequently, the leading OM journals are covered within this SLR.

1 Networks in ATLAS.ti are graphical representations of dots and nodes. They closely resemble the way human memory and thought is structured in comparison to linear, sequential representations (e. g., text). In this case, each code group, including its codes and citations, was analyzed separately to focus on the process.

Table 1: Coverage of journals.

No.	Journal	Identified by de Toni & Parussini (2010)	Identified by Cheng et al. (2015)	Identified within this SLR
1	International Journal of Operations & Production Management (IJOPM)	11	19	13
2	Procedia CIRP	0	0	5
3	International Journal of Production Economics (IJPE)	0	12	4
4	Production Planning and Control (PPC)	2	5	5
5	International Journal of Production Research (IJPR)	0	12	4
6	Journal of Operations Management (JOM)	5	7	3
7	Production and Operations Management (POM)	2	6	2
8	Supply Chain Management: An International Journal (SCMIJ)	1	1	2
9	Journal of Manufacturing Technology Management (JMTM)	4	9	1
10	Omega: The International Journal of Management Science (OMEGA)	2	7	1
11	Harvard Business Review (HBR)	4	4	1
12	Management International Review	1	0	1
13	CIRP Annals	0	0	1
14	Industrial Management & Data Systems	0	0	1
15	Journal on Applied Analytics	0	0	1
16	Management Science (MS)	3	4	1
17	Strategic Management Journal (SMJ)	0	5	0
18	Journal of International Business Studies (JIBS)	2	3	0
19	Journal of Purchasing & Supply Management (JPSM)	2	1	0
20	European Journal of Operations Research (EJOR)	0	3	0
21	Sloan Management Review (SMR)	1	1	0
22	California Management Review (CMR)	1	1	0
23	Interface (IF)	1	1	0
24	Computers and Operations Research (COR)	0	2	0
25	IIE Transactions (IIET)	0	2	0
26	International Journal of Physical Distribution and Logistics Management (IJPDLM)	0	2	0
27	Integrated Manufacturing Systems	2	0	0
		44	**107**	**46**

Table 2 shows the identified 46 articles and their connection to the four clustered code groups. Most articles contribute to several code groups, whereas others focus on and provide insights into one specific category.

Table 2: Inter-respondent matrix showing categorized literature.

	Code Groups			
Articles	Barriers	Success Factors	Specific Approaches	Practices
Richardson et al. 1985		X		
Hayes/Clark 1986		X		
Neely et al. 1995	X	X	X	
Skinner 1996	X			
Toni/Tonchia 2001		X		
Colotla et al. 2003		X		X
Devaraj et al. 2004		X		X
Gopesh/Ward 2004				X
Vereecke et al. 2006		X		X
Swink et al. 2007	X	X		X
West/Bengtsson 2007		X		
Rudberg/West 2008				X
Mauri 2009		X		X
Miltenburg 2009		X		X
Avella/Vázquez-Bustelo 2010		X		
Zhang/Gregory 2011		X		
Lorentz et al. 2012		X		X
Feldmann/Olhager 2013				X
Lampel/Giachetti 2013		X		X
Lanza et al. 2013		X		
Nadja Lee Hansen et al. 2013				
Demeter 2014	X	X		X
Golini et al. 2014		X		
Monauni 2014		X		X
Chatha/Butt 2015		X		X
Chen et al. 2015		X		
Cheng et al. 2015		X		X

Articles	Barriers	Success Factors	Specific Approaches	Practices
		Code Groups		
Mediavilla et al. 2015				X
Thomas et al. 2015	X	X		X
Cheng et al. 2016		X		X
Demeter et al. 2016		X		X
Reuter et al. 2016	X	X	X	
Sager et al. 2016		X	X	X
Sansone et al. 2017		X		X
Scherrer/Deflorin 2017		X		X
Cheng/Farooq 2018				
Costa Ferreira Junior/Fleury 2018		X	X	
Golini/Gualandris 2018		X		X
Olhager/Feldmann 2018		X		
Treber/Lanza 2018		X		X
Arellano et al. 2019				X
Fredriksson/Jonsson 2019				X
Lanza et al. 2019		X	X	
Pashaei/Olhager 2019				X
Wang/Zhang 2019				X
Flaeschner et al. 2020				X

4. Content Analysis and Findings

The primary goal of this systematic literature review was to find out what fundamental approaches from the field of PM are already applied in the IMN research stream and how the PM topic is handled within the IMN literature in general. As expected, few concrete approaches were found, and it is widely recognized that the topic is underrepresented *(Costa Ferreira Junior/Fleury* 2018*; Dietz* 2017; *Liebetrau* 2015; *Reichert* 2010; *Sager et al.* 2016).

The four code groups shown in Table 2 and their sub-code groups constitute the following research framework (see Figure 2):

1. Barriers: IMN researchers have pointed out the barriers in dealing with PM in the context of IMNs.
2. Success Factors: Success factors for conducting effective PM in IMNs were identified.

Barriers

- Missing guidance and standards
- Gap between plant and network level
- Heterogeneity of plants
- Technical barriers
- Implementation and continuation barriers

Success Factors

- Involve diverse types of metrics (not purely quantitative and financial)
- Include aggregable (site level) and non-aggregable (network level) metrics
- Depict both structural/ configurative and infrastructural/ coordinative levers
- Make interaction of plants transparent
- Consider heterogeneity of plants
- Consider relationship between plant and network level
- Follow a systematic development process
- Draw up guidelines for implementation
- Engage skilled and trained employees
- Adapt the system over the course of time

Specific Approaches

- Closed loop performance management process
- Method for the evaluation of performance differences
- Performance Measurement System for Global Manufacturing Networks
- IMN performance assessment process model
- Multi-criteria objective function

Practices

- Strategic focus & alignment
- Internationalization
- Degree of integration & supplier relationship
- Investments
- Plant & network level alignment
- Plant roles
- Product & process alignment
- Standardization
- Information & knowledge exchange
- Benchmarking
- Learning
- Capabilities
- Improvement programs (cost structure, waste, WIP, …)

Figure 2: Performance-related themes drawn from the IMN literature.

3. Specific Approaches: Five specific approaches were identified that are applicable in an IMN context.
4. Practices: Several contributions show the impact of specific practices on improving the performance of IMNs.

The challenges of PM in IMNs can be categorized into five main barriers. The first barrier comprises a lack of guidance and standards. *Costa Ferreira Junior/Fleury* (2018) mention the missing guidance to identify, introduce and manage key figures or an approach to revise existing systems. Based on this SLR, the statement is still valid, although some isolated approaches also exist. Further, *Reuter et al.* (2016) remark the importance of standards for evaluating manufacturing sites and the necessary calculation methods. A further barrier was identified regarding the gap between site- and network-level (Demeter 2014; Thomas et al. 2015; *Wiech/Friedli* 2020). There is a challenge to break down the manufacturing strategy for heterogeneous manufacturing sites (*Thomas et al.* 2015), which entails the break-down of performance indicators accordingly. In the end, improvements in operational measures do not mean improvement in business performance (*Demeter* 2014), which also shows the difficulty of breaking down targets to achieve overarching objectives. The heterogeneity of plants makes it difficult to evaluate performance differences between them, and the disregard of differences leads to the incomparability of indicators *(Reuter et al.* 2016). Technical issues in IMNs are another barrier. There are inconsistent data sources, primarily due to the global dispersion of plants (*Reuter et al.* 2016). Further, there is a lack of transparency regarding cause-and-effect relations (*Reuter et al.* 2016). Finally, the fifth barrier relates to implementation and continuation. Due to potential rejection and lack of commitment within an organization, a developed system may become obsolete over time and no longer reflects the relevant dimensions (*Neely et al.* 1995).

The second code group inherits the success factors for PM mentioned in the IMN literature. Firstly, chosen indicators should not purely be financial. Researchers encourage the use of functional (*Demeter* 2014), cross-functional (*Cheng et al.* 2015), and operational indicators (*Demeter* 2014) in particular. Furthermore, at the network-level, the focus should not be limited to aggregated indicators from the plants but should also include non-aggregated indicators (*Costa Ferreira Junior/Fleury* 2018). The content of a PMS should reflect the structural levers and configuration of the network to determine the success of the global deployment and support its adaptation over time (*Sager et al.* 2016; *Scherrer/Deflorin* 2017). The infrastructural levers and coordination also need to be depictable (*Chatha/Butt* 2015; *Scherrer/Deflorin* 2017). In this respect, it can be helpful to track management measures (*Devaraj et al.* 2004), quantify organizational performance (*Toni/Tonchia* 2001), and the degree of network agility (Monauni 2014). It is also imperative to make cooperation between sites transparent, primarily through information and knowledge exchange (*Cheng et al.* 2016; *Demeter et al.* 2016; *Lanza et al.* 2019). Further, it is essential to take into account the diversity of characteristics of the plants (*Reuter et al.* 2016) as well as the relationship between site- and network-level (*Cheng et al.* 2016; *Devaraj et al.* 2004; *Scherrer/Deflorin* 2017; *Thomas et al.* 2015). Concerning developing a PMS, it is necessary to follow a systematic process (*Neely et al.* 1995). Therefore, *Keegan et al.* (1989) suggest a three-step approach. Also, it is vital to adapt the system over time and remove obsolete parameters from consideration (*Neely et al.* 1995). Therefore, guidelines for introducing such systems should be drawn up (*Neely et al.* 1995). After the successful implementation, it is crucial to ensure the engagement of appropriate employees with the necessary maintenance, analysis, and interpretation skills (*Neely et al.* 1995).

The third code group summarizes five approaches that are suggested for PM purposes in IMNs. First, *Neely et al.* (1995) mention a closed-loop performance management process to design a PMS. Reuter et al. (2016) address the barrier of plant heterogeneity with their method to evaluate performance differences. *Sager et al.* (2016) propose a performance measurement system that focuses on improving network configurations. Further, *Costa Ferreira Junior/Fleury* (2018) suggest a process model for assessing performance at the site- and network-level and thus bridge the gap between these levels. Finally, *Lanza et al.* (2019) point out the value of hierarchical multi-criteria target systems that can be applied to optimize IMN footprints.

The literature presented so far addresses PM itself as a discipline within IMNs. In addition, numerous publications are dealing with the impact of IMN practices on their actual performance. Practices often represent company-specific solutions and can have different impacts on performance based on the contextual factors of an IMN. To prove the effect of practices on performance, both qualitative and quantitative research methods are used. The practices are listed in the framework as part of the core debated topics within the IMN literature stream but will not be explicitly explained at this point, as they do not directly contribute to the understanding of PM and would go beyond the scope of this contribution.

5. Conclusion

Addressing a long-debated gap in the IMN literature, this article aims to shed light on the coverage of PM within the IMN community. A systematic screening of the literature shows an ongoing debate that touches a variety of topics. The topics mainly comprise the barriers and success factors concerning the development and application of an effective PMS, a few attempts to provide specific approaches, and practices to increase IMN performance.

Interestingly, several success factors were identified within the IMN community but are not sufficiently addressed in the existing approaches. Accordingly, the IMN community is aware of the shortcomings in this topic but provides only a few appropriate solutions. The synthesis in this article is the first step to fully address these issues. Further, the barriers and success factors cover both PM and IMN specific issues. Therefore, this research contributes by integrating both literature streams. A major opportunity is that a large part of the literature originates from the manufacturing field. Consequently, it can be stated that the challenges relate to the topic of manufacturing in general, namely the topics that also arise at individual sites and specific IMN issues that also matter.

Regarding the limitations, the proposed framework (see Figure 3) cannot fulfill the demand for total comprehensiveness. On the one hand, it can be extended arbitrarily, especially with general features from the PM research area. On the other hand, the requirements from practice can have a further substantial influence on the framework. Further, the gaps in the IMN area are partly not without overlap with the gaps in the PM area. However, the form presented here gives a holistic overview of the specifics, especially in the IMN area.

5.1 Research Agenda

Three considerable topics for further research regarding PM in IMNs were derived. The topics specifically address the barrier of missing guidance and standards. We perceive that a solution in this regard should be provided, in particular, by the scientific community:

1. Provide IMN-specific performance dimensions and their connections at multiple levels

Some of the identified success factors imply the selection of the appropriate type of performance metrics. To define performance metrics, it is first necessary to determine what performance dimensions are relevant for a holistic representation of an IMN and how they relate to each other. Potential performance dimensions include operational, financial, and innovation performance aspects. For this purpose, frameworks, like the balanced scorecard, can undoubtedly be helpful tools. However, the construct should also close the gap between site- and network-level and show how the dimensions can be used across multiple levels. In this context, it is also essential to know which practices impact specific performance dimensions to establish a direct connection between them.

2. Provide a standard procedure to derive company-specific performance indicators

Since companies are highly diverse, indicators must be derived on a company-specific basis. The IMN-specific performance dimensions outlined above serve as a guideline for finding suitable indicators for each required area. Process models can help to support the deduction process. Company-specific indicators can serve to pay attention to the heterogeneity of sites. To shed light on this issue, qualitative research approaches in the sense of action research are recommended.

3. Provide a conceptual model as a performance-based steering tool for IMNs

The proposal of a conceptual model in line with performance dimensions and practices is needed to guide the actual process of taking actions and monitoring. This enables managers to steer IMNs toward their goals over time. The model should specifically address the gap between site- and network-level and serve to overcome the implementation and continuation barriers.

5.2 Managerial Implications

Advice to practitioners is divided into three key areas, firstly the conceptual framework, secondly, the development process, and thirdly, the implementation and operation of the PMS.

For the conceptual framework, practitioners should use guideline models as a reference for the development-, implementation-, and following application-process. For instance, the process models by *Neely et al.* (1995) or *Costa Ferreira Junior/Fleury* (2018) can be used in this context. The models by *Sager et al.* (2016) and *Lanza et al.* (2019) can be helpful if the focus is purely on configuration. In addition to the guidelines, the definition and regular adaptation of standards for uniform calculation methods, for example, is beneficial. Another vital element for preparing the development of a PMS is the cleansing of heterogeneous data structures and systems.

Subsequently, it is important when developing the actual PMS to select versatile indicators to best reflect the configurational and coordinative levers in IMNs. In doing so, attention should be paid to the heterogeneity of sites, where the approach by *Reuter et al.* (2016) offers a good starting point. The heterogeneity particularly applies to companies that manufacture products for different industries, use different manufacturing principles, or have grown considerably through merger and acquisitions. When designing the PMS, practitioners should also consider both the site- and network-level. Consideration is achieved by cascading targets in a structured way. Here, early involvement of the sites is an excellent way to align interests.

Lastly, the implementation of the system is all about ensuring the commitment of the parties involved. This is done by involving key people in the process at an early stage and clearly communicating the intended goals. In addition, it is essential to continuously develop the system and keep it up to date, which can also mean removing obsolete indicators. The latter is achieved by employing dedicated specialists.

Ultimately, a PMS should always be in harmony with practices because these ultimately improve performance, and the measurement alone is not an end in itself. The proposed practices contribute to improving the performance of IMNs. The combination of practices with the measurement of performance eventually helps to optimize IMNs fundamentally.

References

Arellano, M. C., et al. (2019): Improving operational plant performance in international manufacturing networks: The effects of integrative capabilities and plant roles, in: Production Planning & Control, Vol. 30, No. 2-3, P. 112-130.

Avella, L./Vázquez-Bustelo, D. (2010): The multidimensional nature of production competence and additional evidence of its impact on business performance, in: International Journal of Operations & Production Management, Vol. 30, No. 6, P. 548–583.

Castellano, N. G., et al. (2018): A data-driven analysis of the current debate on the linkages between performance and strategy studies, in: International Journal of Business Performance Management, Vol. 19, No. 1, P. 105.

Chatha, K. A./Butt, I. (2015): Themes of study in manufacturing strategy literature, in: International Journal of Operations & Production Management, Vol. 35, No. 4, P. 604–698.

Chen, L., et al. (2015): The relationship between disclosures of corporate social performance and financial performance: Evidences from GRI reports in manufacturing industry, in: International Journal of Production Economics, Vol. 170, P. 445–456.

Cheng, Y., et al. (2015): International manufacturing network: Past, present, and future, in: International Journal of Operations & Production Management, Vol. 35, No. 3, P. 392–429.

Cheng, Y., et al. (2016): Interplant coordination, supply chain integration, and operational performance of a plant in a manufacturing network: A mediation analysis, in: Supply Chain Management: An International Journal, Vol. 21, No. 5, P. 550–568.

Cheng, Y./Farooq, S. (2018): The role of plants in manufacturing networks: A revisit and extension, in: International Journal of Production Economics, Vol. 206, P. 15–32.

Costa Ferreira Junior, S./Fleury, A. C. C. (2018): Performance assessment process model for international manufacturing networks, in: International Journal of Operations & Production Management, Vol. 38, No. 10, P. 1915–1936.

De Toni, A./Parussini, M. (2010): International manufacturing networks: A literature review, in: Managing Operations in Service Economies, Vol. 17.

Demeter, K. (2014): Operating internationally—The impact on operational performance improvement, in: International Journal of Production Economics, Vol. 149, P. 172–182.

Demeter, K./Szász, L./Rácz, B.-G. (2016): The impact of subsidiaries' internal and external integration on operational performance, in: International Journal of Production Economics, Vol. 182, P. 73–85.

Devaraj, S./Hollingworth, D. G./Schroeder, R. G. (2004): Generic manufacturing strategies and plant performance, in: Journal of Operations Management, Vol. 22, No. 3, P. 313–333.

Dietz, M. (2017): Operative und strategische Kennzahlensysteme für Produktionsnetzwerke: Empirische Ergebnisse und konzeptionelle Überlegungen, Friedrich-Alexander-Universität Erlangen-Nürnberg.

Eisenhardt, K. M. (1989): Agency Theory: An Assessment and Review, in: The Academy of Management Review, Vol. 14, No. 1, P. 57.

Feldmann, A./Olhager, J. (2013): Plant roles: Site competence bundles and their relationships with site location factors and performance, in: International Journal of Operations & Production Management, Vol. 33, No. 6, P. 722–744.

Ferdows, K. (1989): Mapping international factory networks, in: *K. Ferdows* (Hrsg.): Managing international manufacturing, P. 3–21, North-Holland.

Ferdows, K. (2018): Keeping up with growing complexity of managing global operations, in: International Journal of Operations & Production Management, Vol. 38, No, 2, P. 390–402.

Flaeschner, O./Wenking, M./Netland, T. H./Friedli, T. (2020): When should global manufacturers invest in production network upgrades? An empirical investigation, in: International Journal of Operations & Production Management, Vol. 41, No. 1, P. 21–53.

Flick, U. (2009): An introduction to qualitative research, 4th edition, SAGE Publications Ltd.

Fredriksson, A., & Jonsson, P. (2019): The impact of knowledge properties on international manufacturing transfer performance, in: Production Planning & Control, Vol. 30, No. 2–3, P. 197–210.

Friedli, T./Lanza, G./Remling, D./Kaiser, J./Verhaelen, B./Benfer, M. (2020): Benchmarking Managing Global Production Networks: General Report, St. Gallen.

Glaser, B. G./Strauss, A. L. (2009): The discovery of grounded theory, 4^{th} edition, Aldine.

Golini, R./Gualandris, J. (2018): An empirical examination of the relationship between globalization, integration and sustainable innovation within manufacturing networks, in: International Journal of Operations & Production Management, Vol. 38, No. 3, P. 874–894.

Golini, R./Longoni, A./Cagliano, R. (2014): Developing sustainability in global manufacturing networks: The role of site competence on sustainability performance, in: International Journal of Production Economics, Vol. 147, P. 448–459.

Goshu, Y. Y./Kitaw, D. (2017): Performance measurement and its recent challenge: A literature review, in: International Journal of Business Performance Management, Vol. 18, No. 4, P. 381.

Hansen, Z. N. L./Zhang, Y./Ahmed-Kristensen, S. (2013): Viewing engineering offshoring in a network perspective: Addressing and managing risks, in: Journal of Manufacturing Technology Management, Vol. 24, No. 2, P. 154–173.

Keegan, D. P./Eiler, R. G./Jones, C. R. (1989): Are your performance measures obsolete?, in: Management Accounting, Vol. 6, P. 44–50.

Lampel, J./Giachetti, C. (2013): International diversification of manufacturing operations: Performance implications and moderating forces, in: Journal of Operations Management, Vol. 31, No. 4, P. 213–227.

Lanza, G./Ferdows, K./Kara, S./Mourtzis, D./Schuh, G./Váncza, J./Wang, L./Wiendahl, H.-P. (2019): Global production networks: Design and operation, in: CIRP Annals, Vol. 68, No. 2, P. 823–841.

Lanza, G./Stoll, J./Stricker, N./Peters, S./Lorenz, C. (2013): Measuring Global Production Effectiveness, in: *Procedia CIRP*, Vol. 7, P. 31–36.

Liebetrau, F. (2015): Strategic Performance Measurement and Management in Manufacturing Networks—A Holistic Approac to Manufacturing Strategy Implementation, University of St. Gallen.

Lorentz, H./Töyli, J./Solakivi/T., Hälinen, H./Ojala, L. (2012): Effects of geographic dispersion on intra-firm supply chain performance, in: Supply Chain Management: An International Journal, Vol. 17, No. 6, P. 611–626.

Mancini, D./Piscitelli, G. (2018): Performance measurement systems in business networks: A literature review, in: International Journal of Business Performance Management, Vol. 19, No. 1, P. 87.

Mauri, A. J. (2009): Influence of MNC Network Configuration Patterns on the Volatility of Firm Performance, in: Management International Review, Vol. 49, No. 6, P. 691–707.

Mediavilla, M./Errasti, A./Mendibil, K. (2015): Framework for assessing the strategic plant role and deploying an improvement roadmap in global operations networks: An empirical study, in: Production Planning & Control, Vol. 26, No. 10, P. 799–823.

Miltenburg, J. (2009): Setting manufacturing strategy for a company's international manufacturing network, in: International Journal of Production Research, Vol. 47, No. 22, P. 6179–6203.

Monauni, M. (2014): Agility Enablers in Production Networks – Pooling and Allying of Manufacturing Resources, in: Procedia CIRP, Vol. 17, P. 657–662. 6

Neely, A./Gregory, M. J./Platts, K. (1995): Performance measurement system design, in: International Journal of Operations & Production Management, Vol. 15, No. 4, P. 80–116.

Neely, A./Richards, H./Mills, J./Platts, K./Bourne, M. (1997): Designing performance measures: A structured approach, in: International Journal of Operations & Production Management, Vol. 17, No. 11, P. 1131–1152.

Olhager, J./Feldmann, A. (2018): Distribution of manufacturing strategy decision-making in multi-plant networks, in: International Journal of Production Research, Vol. 56, No. 1–2, P. 692–708.

Onwuegbuzie, A. J./Frels, R. (2016): 7 steps to a comprehensive literature review, SAGE.

Onwuegbuzie, A. J./Leech, N. L./Collins, K. M. (2012): Qualitative Analysis Techniques for the Review of the Literature, in: The Qualitative Report, Vol. 17, No. 28, P. 1–28.

Pashaei, S./Olhager, J. (2019): Product architecture, global operations networks, and operational performance: An exploratory study, in: Production Planning & Control, Vol. 30, No. 2–3, P. 149–162.

Reichert, F. (2010). Die struktur- und kompetenzbasierte Methodik zur globalen taktischen Produktionsplanung, ETH Zurich.

Reuter, C./Prote, J.-P./Stöwer, M. (2016): Evaluation of Performance Differences between Manufacturing Sites, in: Procedia CIRP, Vol. 50, P. 342–347.

Rudberg, M./West, B. M. (2008): Global operations strategy: Coordinating manufacturing networks, in: Omega, Vol. 36, No. 1, P. 91–106.

Sageder, M./Feldbauer-Durstmüller, B. (2019): Management control in multinational companies: A systematic literature review, in: Review of Managerial Science, Vol. 13, No. 5, P. 875–918.

Sager, B./Hawer, S./Reinhart, G. (2016): A Performance Measurement System for Global Manufacturing Networks, in: Procedia CIRP, Vol. 57, P. 61–66.

Sansone, C./Hilletofth, P./Eriksson, D. (2017): Critical operations capabilities for competitive manufacturing: A systematic review, in: Industrial Management & Data Systems, Vol. 117, No. 5, P. 801–837.

Scherrer, M./Deflorin, P. (2017): Linking QFD and the manufacturing network strategy, in: International Journal of Operations & Production Management, Vol. 37, No. 2, P. 226–255.

Schläfke, M./Silvi, R./Möller, K. (2012): A framework for business analytics in performance management, in: International Journal of Productivity and Performance Management, Vol. 62, No. 1, P. 110–122.

Shi, Y./Gregory, M. (1998): International manufacturing networks-to develop global competitive capabilities, in: Journal of Operations Management, Vol. 16, No. 2–3, P. 195–214.

Taticchi, P./Balachandran, K. R. (2008): Forward performance measurement and management integrated frameworks, in: International Journal of Accounting & Information Management, Vol. 16, No. 2, P. 140–154.

Thomas, S./Scherrer-Rathje, M./Fischl, M./Friedli, T. (2015): Linking network targets and site capabilities: A conceptual framework to determine site contributions to strategic manufacturing network targets, in: International Journal of Operations & Production Management, Vol. 35, No. 12, P. 1710–1734.

Toni, A./Tonchia, S. (2001): Performance measurement systems—Models, characteristics and measures, in: International Journal of Operations & Production Management, Vol. 21, No. 1/2, P. 46–71.

Treber, S./Lanza, G. (2018): Transparency in Global Production Networks: Improving Disruption Management by Increased Information Exchange, in: Procedia CIRP, Vol. 72, P. 898–903.

Wang, X./Zhang, Y. (2019): Engineering network operations for international manufacturing: Strategic orientations, influencing factors and improvement paths, in: Production Planning & Control, Vol. 30, No. 2–3, P. 239–258.

West, B. M./Bengtsson, J. (2007): Aggregate Production Process Design in Global Manufacturing Using a Real Options Approach, in: Internationl Journal of Production Research. Vol. 45, No. 8, P. 1745–1762.

Wiech, M./Friedli, T. (2020): Using plant leaders' perspectives to overcome barriers to inter-plant exchange, in: Journal of Manufacturing Technology Management, ahead-of-print.

Yadav, N./Sagar, M. (2013): Performance measurement and management frameworks, in: Business Process Management Journal, Vol. 19, No. 6, P. 947–971.

Zhang, Y./Gregory, M. J. (2011): Managing global network operations along the engineering value chain, in: International Journal of Operations & Production Management, Vol. 31, No. 7, P. 736–764.

Dominik Remling, M.Sc., is a research associate at the Institute of Technology Management of the University of St.Gallen and heads the research group 'Global Production'.

Address: Institute of Technology Management, University of St.Gallen, Dufourstrasse 40a, CH-9000 St. Gallen, Tel.: +41 (0) 71 224 7269, E-Mail: dominik.remling@unisg.ch