29. The effect of BPO Capability on Business Performance through Collaboration Practices and ERP Development

by Zeplin Tarigan

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El efecto de la capacidad de BPO en el rendimiento empresarial a través de prácticas de colaboración y desarrollo de ERP

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Abstract
This study investigates effect of business process owner (BPO) capability on business performance through collaboration practices and enterprise resource planning (ERP) development with the moderating of vendor competency. Data collection used questionnaire and used PLS. The result is capability BPO provides influence ERP development, collaboration practices and business performance. Vendor competency moderate's relationship of BPO capability and ERP development. Vendor competency didn't moderate the relationship of BPO capability and collaboration practices. Collaboration practices influence ERP development and business performance.
key words: BPO capability, business performance, vendor competency

Resumen
Este estudio investiga el efecto de la capacidad del propietario del proceso empresarial (BPO) en el rendimiento empresarial a través de prácticas de colaboración y desarrollo de planificación de recursos empresariales (ERP) con la moderación de la competencia del proveedor. La recolección de datos utilizó el cuestionario y el PLS utilizado. El resultado es la capacidad que BPO proporciona influencia en el desarrollo de ERP, prácticas de colaboración y rendimiento empresarial. La competencia del proveedor moderó la relación de la capacidad de BPO y el desarrollo de ERP. La competencia del proveedor no moderó la relación de la capacidad de BPO y las prácticas de colaboración. Las prácticas de colaboración influyen en el desarrollo de ERP y el rendimiento empresarial.
Palabras clave: Capacidad de BPO, rendimiento comercial, competencia del proveedor

1. Introduction

For many years, middle and upper-class companies have adopted information technology into their practices using enterprise resource planning (ERP). However, the existing ERP implementation does not sustain since the business process, and the operating process is continuously evolving. Consequently, ERP software needs development to tailor with the current business process model (Panayiotou et al. 2015). There is a need for management to develop and update the ERP software and hardware following every change in the operational system. In practice, the development of ERP systems usually involves the vendors of ERP to shortening the time required. In addition, the development of ERP is a strategic decision since it requires expensive resource

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allocations such as capital, human resources, and specific hardware and software. Besides resource allocation, top management also needs to support in terms of financial availability, the establishment of policies, and the setup of procedures to ensure the ERP development can be carried out effectively and efficiently. ERP System development usually is carried out through project work, and there is a risk that the project fails. Garg and Khurana (2017) state that there are three potential risks if companies do not implement ERP development in an appropriate way. First, provision of inadequate training, unwillingness to share knowledge and business, unwillingness to change, and low employee involvement. Second, technological risk consisting of insufficient information technology infrastructure, the reduced capability of ERP vendor, poor data integration, and small data accuracy. The third risk is the project performance risk when there is a gap between the ERP system and the company's operations process, lack of vendor support, lower division of workload, inadequate documentation, unclear changes, and vague ERP system requirements. The fourth possible risk is poor ERP system development strategy, weak company management capability, weak management commitment, instability in the ERP development team, organizational instability, and relatively low coordination between departments.

ERP application and development provide benefits for the company in supporting top management in making a decision such as operational planning, scheduling, resource allocation, communicating data, and strategies with all employees (Rouhani and Mehri, 2018). The study also suggests that ERP implementation support management for accountability and synchronization of business changes, monitoring the duties and responsibilities of employees, making quick reports for all employees, accelerating decision-making, and monitoring all activities within the company (Hassan and Mouakket, 2016). The development of the ERP software and hardware on an ongoing basis makes ERP function stable and proper. The maintenance and development of ERP systems are carried out independently by the company or jointly with ERP vendors. Collaboration built between the company and the vendor usually is initiated by the business process owner (BPO) or can also be called a key user (Kharuddin et al. 2015). The objective of the collaboration is to customize the company's ERP system based on the current business process. The ERP vendor will make changes and upgrade the software tailored to any changes in the company's business process. The development of the ERP requires the involvement of the vendor for the reason of time and expertise (Wang and Wang, 2019). Besides the lower cost of development, the participation of ERP vendors will also accelerate the process; hence, the company will spend less time on the development.

The key user in the company acts as the business process owner (BPO) in their respective departments. The BPO is the person in charge of ERP developing a project, in other words, being a project manager. A BPO needs adequate capability to speed up the development in the company. Today, the manufacturing companies in East Java have implemented ERP for more than six years on average, and these companies should have developed and adjusted the ERP system with the on-going developed operational systems. If the system development is carried out on time and continuously, the companies will obtain the benefits in terms of financial or non-financial performance (Tarigan et al. 2019). The ability of BPO is, therefore, essential, and it is crucial in collaborating with ERP vendors. Another reason why collaboration with ERP vendors required is the knowledge transfer from the BPO to other departments and newly recruited users. At present, almost 70% of the research respondents become BPOs perform independent learning because they replaced and occupied the previous BPO. They, therefore, need skills and expertise transfer from the ERP vendor.

In summary, the above background and previous research indicated that keeping the ERP system up to date with the on-going business process is a complicated task and involves a cross-functional and external partner, i.e., ERP vendor. The question raised is how BPO capability affects business performance by taking into account the ERP development, collaboration practices, and vendor competency. This study proposes a research model to examine the impact of BPO capability on business performance through the ERP development and collaboration practices,

with the moderating role of vendor competency. This study is expected to the on-going supply chain management theory and provides an insight for the industry to enhance the business performance.

2. Literature Review and Research Hypothesis

2.1. Enterprise Resources Planning Development

ERP is an information technology system that integrates all company functions into a single database [Panayiotou et al. 2015, Rouhani and Mehri, 2018, Kharuddin et al. 2015, Tarigan et al. 2019, Novikov and Sazonov, 2020]. ERP has evolved significantly, and many companies have automated the information system within the company in providing quick and accurate data. The ERP implementation in companies is carried out in various stages, starting from top management decisions to use ERP. Based on the management decision, subsequent steps are following vendor sourcing, vendor selection, gap analysis between the company's operations and ERP systems, infrastructure preparation, ERP implementation settings, data preparation, ERP data integration, customizing ERP, and go live declaration. Meanwhile, the development stage is performed during ERP implementation by analyzing the current company's business processes, adjusted to the ERP system, upgrading software, and upgrading the ERP hardware. ERP are able to provide benefits for companies in improving the company's operational performance and financially performance (Kharuddin et al. 2015, Tarigan et al. 2019).

The main objective of ERP development is to maximize the value-added for the company. The companies need the most updated knowledge and expertise from vendors to establish a new business processes using information technology (Das and Grover, 2018). Adjustment of business functions and process usually redesign the operational processes before being translated into the ERP system. The ability of vendors to design the ERP modules that fit to the new operational process will enable vendor to develop the ERP systems much easier. Hence, ERP vendors play an essential role in the success in ERP development (Dezdar, 2012). ERP system used by the company should always tailor to the current needs of the company and should be able to keep up to date with any changes. Since the development of ERP by the company is usually involve only limited members such as end-users and critical users only, the management, therefore, should make available the required supporting document such as written rules of business blueprint, standard operating procedures, work instructions, and forms. These supporting documents help end-users understand to use the ERP system and to adjust the ERP system to the ongoing company's operations system. The ERP system development is usually carried out by project work structure to achieve the goals within particular limited time and resource, which enables the company benefit from the efficiency, system acceptance, completeness, credibility, accuracy, and impact on users as expected (Aubert et al. 2013).

When an adjustment take place on the implementation or development, the vendor and the team will train key users or end-users, to transfer knowledge as a form of organizational learning (Shao et al. 2017). The knowledge transfer allows the key users and ends users, to continuously improve the system in the pursuit of the increasingly advanced operating process (Suprapto et al. 2017). Post-implementation of ERP is the most critical process because the key users are responsible for carrying out continuous development. The development can be done by updating and increasing the knowledge of hardware and software. This change will require key users and end-users to improve their capabilities through training set in the company. Continuous training will provide knowledge and expertise in implementing implementers and corporate ERP users (Rajan and Baral, 2015).

2.2. BPO Capability

ERP is one of the information technology systems used to integrate the activities within a company. Each department and function in a company uses an ERP system to connect with other departments or services based on the company's operation system. Each department has a manager called the BPO or key user as the person

responsible for developing ERP modules in his department (Tarigan et al. 2019). The department includes marketing, production planning, inventory control, accounting, warehouse, quality system management, maintenance, and human resources management. The Owner of business process requires an adequate capability to perform the task assigned and the business process owner at the company is the person responsible for departmental functions, namely the manager of the department (Kohlbacher, M. and Gruenwald, 2011). Capacity is the ability of BPO to design and complete their roles within their departments related to the company operation process. BPO is also responsible for proper ERP implementation in their respective departments. The criteria for a business process owner are having global orientation, understanding function integration, understanding between functions and between departments relationship, having leadership skills, having proper analysis, having adequate technical expertise, and superior in business skills. The competencies possessed by IT project managers include skills, optimism, leadership, behaviors, and personal attributes (Smith et al. 2011). The ability of a BPO, which is also referred to as BPO capability, is the ability to carry out their duties and responsibilities as well as their authority.

BPO, as the person in charge of the IT program, is responsible for preparing operational blueprints of each department's functions, integrates data with other departments, makes standard operating procedures, determines the number and forms of reports in his department, estimates the number of employees in his department. The BPO also carries out individual development for each person in his department and customizing it to be able to follow changes in the company's operations and adjusting the company's operations by the company's IT system (Parolia et al. 2013). The ability of a BPO highly determines the success of an ERP implementation.

2.3. Vendor Competency

The company needs to involve vendors in developing and implementing the ERP system. The vendors contribute to providing software, hardware, and adequate expertise in adjusting the ERP systems with the current business processes. The Companies, therefore, should ascertain that they invited the appropriate vendors in terms of having excellent expertise in the information technology and ERP application. The ability of vendors to share and transfer knowledge by providing an overview of ERP through government representatives in Malaysia so that local companies with small and medium-sized companies are able to implement ERP properly. This is if it is supported by the Malaysian government in providing investment funds for ERP implementation (Kharuddin et al. 2015).

Wang and Wang (2019) suggested that Vendors should have highly specialized knowledge in ERP development required to improve the operating system and develop a more efficient and effective ERP system. Vendors who have a high level of expertise can expand the system quickly with affordable costs and excellent quality (Faisal and Raza, 2016). The company's decision to outsource the ERP development benefits the companies in terms of minimized activities of the organization. Maelah et al. (2012) stated that the vendor should have particular characteristics, such as having the relevant knowledge, established reputation, adequate expertise, and high competence. Besides, the vendor should have the adequate capability, technical skills, financial stability, and a recognized past performance (Perunović et al. 2012). Das and Grover's (2018) states that the vendor must have adequate capabilities, excellent services, credentials, and reputation.

2.4. Collaboration practices

A collaboration gathers various parties with different interests to produce a shared vision, build agreement on an issue or problem, creates a solution to the problem, and put forward shared values to produce decisions that benefit all parties. In the same manner, company builds a collaboration with vendors to develop the software systems with the agreed task and responsibility (Ali and Khan, 2016). Collaboration in the form of partnerships is

to connect two or more members in building a commitment and maintaining the relationship process with the goals set. Both parties use their core capabilities to deal with changes and challenges that are appropriate to the needs of the organization. Collaboration is useful in accelerating the achievement of the expected goals to reduce the company's cost burdens. Collaborative partnership in the long term is the best solution for developing business processes, along with reducing costs and adding value to the company. The collaboration with vendors of ERP system will be able to improve integration systems in the pursuit of excellent information sharing. Collaboration between companies and ERP vendors synchronize the decisions between departments within the company to achieve the stated shared goals (Chakrabarty and Whitten, 2011). Collaboration in the form of IT outsourcing is useful to reduce costs and risk hence increase the benefit for both parties between the company and its vendors (Cetinkaya et al. 2014).

A Collaboration built by companies with ERP vendors through the development of ERP systems provide the data integration of the company quickly, precisely with much better quality. The ability of BPO in their interactions to share information with vendors, such as explaining the company's business processes in detail, enables vendors to develop the company's ERP systems accordingly. The collaboration between company and vendor should create complete models of corporate ERP systems. Companies, through BPO, must be able to explain and design business processes tailored to operational conditions. The company then request the vendors to develop ERP systems in line with the operational needs of each department or function within the company. Similarly, vendors need to understand the company's requirements in term of technical issues related to the project goals (Perunović et al. 2012). Vendors must also have the ability to complete projects and meet company demands (Das and Grover, 2018).

2.5. Business Performance

ERP post-implementation was defined as the condition when the ERP system was implemented, maintained, and developed. Rothenberger et al. (2010) stated that ERP implementation provides strength for companies to support all company activities, provide satisfaction to stakeholders, and system acceptance. The top management implements ERP to create and build new business images, efficient processes, work effectiveness, reduced costs, integrated databases, improved performance, improved employee work skills, better data security, and reduction in workload (Hassan and Mouakket (2018). The post-implementation of ERP provides benefits including informative empowering, communicative empowering, growth and learning, and strategic empowering (Rouhani and Mehri, 2018). ERP provides benefits for companies to improve business performance in term of inventory reduction, demand management improvement, reduction in company operational costs. Also, the ERP enables the integration between departments, standardization of processes, company effectiveness, increased corporate flexibility, and customer satisfaction (Suprapto et al. 2017). Operational performance is part of the business performance measured by non-financial performance, including speed of delivery, ability to fulfill company orders, increased flexibility, and customer satisfaction (Tarigan et al. 2019). ERP implementation in companies can provide benefits in making appropriate decisions making, more responsive to customers, better knowledge and information sharing between employees, operational costs reduction, increasing company productivity, increasing company profit, improved efficiency, and effectiveness of the company (Dezdar, 2012).

2.6. Research Hypotheses

Changes in globalization have had an impact on the regional or domestic change, and the top management should make appropriate decisions on time. The company's top management requires accurate, timely, and complete data. The provision of this data relies on ERP performance, which recorded all data from the past operational activities. The company needs to develop and upgrade the ERP system following the current operating system of the company. The development of the ERP system is necessary to make sure the consistency

between the business process of each department and the ERP system itself. Maintaining the ERP system consequently requires software and hardware upgrade, and the BPO across all functions should collaborate to integrate the data between all function process (Novikov and Sazonov, 2020). For the best result, the BPO need help from external parties, namely ERP vendors. The primary purpose of involving ERP vendor is to make adjustments between the developed business process and the ERP system. The collaboration will make sure that the change in the business process is in line with the ERP system.

Figure 1
Research Model
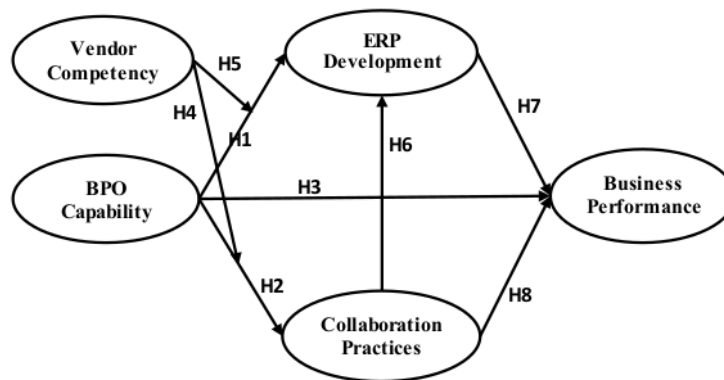
Based on previous studies as discussed on the previous literatures review, Figure 1 presents the research model to be examined, and the following hypotheses are proposed:

H1: BPO capability affects ERP development.

H2: BPO capability affects collaboration practices.

H3: BPO capability affects business performance.

H4: Vendor competency moderate the effect of BPO capability on ERP development.

H5: Vendor competency moderate the effect of BPO capability on collaboration practices

H6: Collaboration practices influences ERP development.

H7: Collaboration practices affects business performance.

H8: ERP development affects business performance.

3. Methodology

The population of this study is all 324 medium and large-scale manufacturing companies engaged in various industry and registered in the Ministry of Industry and Trade Department, East Java, Indonesia. However, those companies are not all engaged in the manufacturing area. Some of the companies are engaged in the related area such as supplier, logistic, and distributors. The authors consider only 81 companies which are engaged directly in manufacturing and meet the criteria of medium and large-scale manufacturing. These number of companies become the population on this study. The survey was conducted in two parts. The first part is a qualitative interview, and the second part is a quantitative interview. The objective of the qualitative interviews is to collect in-depth information about the practices of ERP system development and the role of vendors in

collaborating with BPOs. Interviews were conducted with semi-structured techniques. Meanwhile, the quantitative interview was conducted using questionnaire, which was designed to assess the extent to which the company has implemented the construct of the research. The questionnaire was designed using a five-point Likert scale. The BPO capability using five indicators, namely: the ability to perform the tasks assigned, ability to use the given authority, ability to manage subordinates, understanding the business process, and the ability to master ERP systems technically. Collaborative practices used four items of indicator, i.e., knowledge sharing to succeed in ERP projects, capabilities to adjust business processes with ERP systems, knowledge sharing between the two parties, and sharing information between the two parties. The ERP development used four indicators, i.e., ERP compatibility with the company's operational systems, complete ERP data integration between functions, ERP software comply with company requirements, and hardware ERP fulfill company requirements. Vendor competency as moderating construct is measured by items: vendors have technical expertise in ERP, costs offered by vendors are affordable to companies, vendors have a reliable reputation, and expertise of vendors is adequate. Business performance is an objective construct that is measured by controlling inventory system-level items, controlling order management better, controlling the delivery system appropriately, reporting complete data in the company, and increasing customer satisfaction.

Before collecting the data, the author has made calls to the respondent candidates to ask if they are willing to be respondents. The author has made contact via WhatsApp for 29 BPOs, via direct telephone call 14, through mobile phones and via email as many as two BPOs, which is in total 45 BPOs. Those 45 BPOs are willing to participate as a respondent for this study. In conducting the interview, the authors have been working together with 12 students of the Petra Christian University, Faculty of Business and Economics. The authors initially conducted direct interviews with four respondents. During the interview, the 12 students are involved in training them on how to conduct an appropriate interview with the respondent. Subsequently, a team of 12 students interviewed 41 BPOs from the manufacturing companies. However, five companies refuse to be interviewed for the reason of company policy. Thus, in the end, there were only 40 companies had been successfully interviewed and filled in the questionnaires. When the survey and interview have finished, and the data is correct, a discussion through phone call or e-mail were conducted with several respondents when considered necessary. Qualitative analysis is used to obtain more detailed information and explanations about the results of quantitative analysis that has been processed with hypothesis testing. The qualitative survey is conducted by giving open questions related to collaborative practices covering the type of ERP software implemented in the company, the meeting frequency between BPOs and vendors, the duration the company has implemented ERP, BPO capability obtained during the collaboration process with vendors, the impact of vendors competency on BPO capability.

The additional related qualitative question is asking the respondent if the vendor is actively assisting the ERP development, involved in dealing with company trouble systems, and maintain communication during at least two years after the ERP system is in operation. With the amount of data is only 40 questionnaires, the authors considered that it was not enough compared with the number of the total population. Then, the authors decide to conduct the second data collection by distributing the questionnaires to 36 companies. From the 36, 30 questionnaires have been obtained. Hence, there 70 data available for further analysis. Table 1 demonstrated the registered manufacturer and the sample deployment for further analysis. Based on Table 1, the largest number of companies are companies engaged in furniture and processed wood, there are 63 companies and manufacturing industry sectors that mostly implementation and use ERP are 24 food and beverage manufacturing companies. Table 1 shows the composition of the population and samples involved in the survey. It demonstrated that the population represents a diverse type of manufacturer engagement. The samples composition is also considered represents the diversity of the population (Sekaran and Bougie, 2016).

Table 1
Manufacturer Engagement and Sample Deployment

Manufacturer type	No. of Companies	Non-ERP	Use ERP	No. of Sample Company		Valid questionnaires	
				Public	Private	Public	Private
Food and beverage	32	8	24	5	10	3	7
Household	8	4	4	1	2	1	2
Furniture and processed wood	63	46	17	7	3	5	2
Plastic product	22	12	10	3	3	3	3
Packaging	12	6	6	2	3	1	1
Animal feed	8	2	6	1	3	1	3
Pulp and Paper	13	9	4	2	1	2	1
Metal	38	25	13	5	3	5	3
Ceramic	12	7	5	1	1	1	1
Machinery and spare part	11	5	6	2	2	2	2
Building material	8	4	4	1	1	1	1
Oil and Gas	7	4	3	1	1	1	1
Pharmacy	6	2	4	1	1	1	1
Electronic	4	0	4	0	1	0	1
Electrical	13	8	5	2	1	2	1
Garment	36	27	9	3	2	3	2
Cigarettes	4	1	3	1	1	1	1
Transportation	13	6	7	1	1	1	1
Chemical Industry	14	7	7	1	1	1	1
Total	**324**	**183**	**141**	**41**	**40**	**35**	**35**

4. Results and Discussion

ERP application, Table 2 indicates that the composition of respondents in term of current position, work experiences, model of ERP used, and the duration of the ERP adoption. The result of the descriptive analysis demonstrated that those respondents represent the diversity of the population, which means that the result of this study reflected the population of the study would be applicable for the manufacturing company engaged in the Industry.

Table 2 also shown that all sample of this study have used ERP in their operational activities even though they used a different type of ERP product. The above results indicated that departments or functions have adopted the ERP system to assist the unit get the information required. The respondents of this study are of diverse position i.e., 52% are from the middle management's position (manager and assistant manager), and 43% are engaged as the top management (general manager/plant manager and director / national manager). An interesting fact is that 95% of the companies have adopted ERP system into their operation which means there is a need to adapt and develop ERP system. The majority of the respondents, 95%, have adopted the ERP system for more than five years. This proved that the respondents are highly knowledgeable and experienced in operating the ERP. The ERP with the SAP model is the most adopted model, 43%, by the Industry, while the second most adopted self-developed model, 37%. The benefit of Self-development is the relatively low costs and building an ERP system according to the actual need of the company. However, self-development takes longer time, typically since they start from zero. The company's self-development model is based on several reason

such as lower cost of the post-implementation maintenance costs, and there is no fixed cost. Post-implementation maintenance is relatively cheaper and making changes to the company's system is practically much easier since if the ERP developed by internal function.

Table 2
Respondents Characteristics

Descriptive term	Number (n)	Percentage
Department	**70**	**100 %**
General (Top Management)	17	24.3 %
Production	13	18.6 %
Planning Production Inventory Control	7	10 %
Marketing	7	10 %
Accounting	1	1.4 %
Finance	3	4.3 %
Material Management (Purchasing)	7	10 %
Quality Assurance	4	5.7 %
Industrial Engineering	3	4.3 %
Human Resources	5	7.1 %
Warehouse	3	4.3 %
Position	**70**	**100 %**
Director/National Manager	11	15.7 %
General Manager/Plant Manager	19	27.1%
Manager	32	45.7 %
Assistant Manager	5	7.1 %
Staff Officer	2	2.9 %
Senior Staff	1	1.4 %
Work experiences	**70**	**100 %**
Less than three years	1	1.4 %
Three up to 5 years	2	2.9 %
Five up to 10 years	31	44.3 %
More than10 years	36	51.4 %
ERP model	**70**	**100 %**
SAP	30	42.9 %
ORACLE	8	11.4 %
BAAN	0	0.0
MFG PRO	1	1.4 %
JD Edwards	3	4.3 %
People Soft	2	2.9 %
Self Development	26	37.1 %
Implementation duration	**70**	**100 %**
Two up to 3 years	14	20 %
Three up to 5 years	30	42.9 %
Five years and up	26	37.1 %

Descriptive analysis was also conducted to find out if the company has implemented the ERP system properly. This is performed by assessing the average score of the indicators representing the associated variable. Table 3 demonstrated the classification of the score into five categories namely: 1.00 - 1.80 (very poor in implementation); 1.80-2.60 (not good at implementation), 2.61-3.40 (good enough in implementation), 3.41-4.20 (good in implementation) and 4.21-5.00 (very good implementation). BPO capability has the average value

of 4,41. This score indicated that key people in the ERP implementation functions in each company department have excellent capability. BPO has carried out the duties and responsibilities that have been given by top management to them. BPO also has a good ERP engineering capability with an average score of 4.53. This finding means that BPO can adjust the ERP system with the company's need very well. The second construct, collaboration practice, is a joint process operation between vendors of ERP with BPO as the most knowledgeable person about the company's operating systems.

Collaboration practice creates, unites, and adapts two systems that are important for a company's business process. Collaboration practice has the score of 4.37, which is categorized as very well. The collaboration practice process has one the most correlated indicator, which is the knowledge sharing between vendors and BPO with the value of 4.60. This shows that there is an excellent sharing of knowledge between vendors and BPO. This finding proved that knowledge sharing from the vendor to the BPO is taking place in the manner of continuous process. When the ERP is declared to go live, and the Vendor leave the company, the knowledge transfer has taken place, and the development process is then handed over to the company, especially the BPO in their respective departments. ERP development is the main output of the collaboration process between the BPO and the vendor so that the two systems (the company's operational system and ERP system) constitutes a company system integrated with ERP. While the ERP development indicated the suitability of the ERP system according to the requirement of the company, with an average score of 4,08. The ERP development is furtherly carried out by the BPO after the on-going agreement completed by the provider and consultant. The respondents appraise the ERP development has been performed appropriately in term software, hardware, and data integration based on the company requirement.

Vendor competency is defined as the expertise and ability the provider and consultant have, enabling them to develop ERP systems as needed by the company. ERP system package providers always provide consultancy in implementing and developing ERP by the company. Vendor competency highly determines the success of ERP implementation and development in the company. The respondent feedback indicated that vendor competency was rated to 4.25, which is categorized as very good. This score proved that the vendor owns an appropriate competency in implementing and customizing ERP. The measurement that vendors provide consultancy at an affordable cost is perceived to be very good by the respondent, with the score of 4.3286. From the interviews conducted with several companies using the ERP package witness that the majority of the consultants are domiciled in Indonesia, hence they could bid at a relatively lower price. Moreover, the provider offers the consultancy and the provision of the ERP system in one package, which allow the lower price bid. Vendors reputation is perceived as very good with the score of 4.21 which means the vendor has adequate experiences in setting up the ERP system and collaborate with the consultant. The consultants and vendors are a package that the company receives when implementing ERP.

Business performance is obtained with an average score of 4,37; this shows that manufacturing companies had benefited when ERP was implemented in the company. Respondents stated that the business performance obtained in carrying out operational control of the company was started to be very good. Increased customer satisfaction was also rated at 4.44, categorized as very good. Business performance obtained by the company with the development of ERP has provided fast information for decision-makers. This is seen with order control, complete data management report, inventory level control, and control of the delivery system obtained with excellent score. Quantitative data processing is used to assess the measurement model and test the research hypotheses.

Table 3
Indicator descriptive analysis

Variable/indicator	Mean	Remarks
BPO ERP Capability	4.41	Very good
Ability to carry out tasks (X11)	4.27	Very good
Ability to use authority (X12)	4.44	Very good
Ability to manage subordinates (X13)	4.45	Very good
Skills in understanding business processes (X14)	4.35	Very Good
Ability to master ERP technically (X15)	4.52	Very good
Collaboration Practice	4.37	Very good
Ability to jointly succeed in ERP project (X21)	4.40	Very good
Shared capabilities adjust the business process (X22)	4.21	Very good
Knowledge sharing between vendors and BPO (X23)	4.60	Very good
Sharing information between vendors and BPOs (X24)	4.25	Very good
ERP Development	4.08	Good
ERP compatibility with company systems (X31)	4.02	Good
Data integration between functions is complete (X32)	4.00	Good
ERP software according to needs (X33)	4.15	Good
Hardware ERP according to needs (X34)	4.12	Good
Vendor Competency	4.25	Very good
Technical capability of vendors on ERP (X41)	4.32	Very good
Cost affordable for the company (X42)	4.34	Very good
Vendors have a reliable reputation (X43)	4.21	Very good
Vendors have adequate expertise (X44)	4.12	Good
Business Performance	4.37	Very good
Inventory level control (X51)	4.37	Very good
Order fulfillment (X52)	4.41	Very good
Delivery management (x53)	4.24	Very good
Data reporting in the company (X54)	4.35	Very good
Increased customer satisfaction (X55)	4.44	Very good

Data analysis was performed using partial least square structural equation modeling (Lockström and Lei, 2013). Assessing the measurement model is conducted by looking at the validity and reliability of those indicator of each variable. Once the measurement model is considered valid and reliable, the next step of analysis is to test each hypothesis by looking at the t-value of each relationship. The hypotheses are supported once the t-value greater than 1.96. Assessment result of the validity of indicators is shown in Table 4. Reliability testing of research variables is to determine the reliability or consistency of the variables used, as demonstrated in Table 4.

Based on Table 4, it is shown the assessment result of all the indicator validity where the factor loading values are higher than 0.5. BPO capability has all its indicator with factor loading value between 0.592 and 0.861. The second variable, practice collaboration (X2), also has all its indicators with the factor loading between 0.638 and 0.772. This shows that the four measurement items have met the requirements. The third variable, ERP development (X3), has all the indicators are valid with the factor loading between 0.636 and 0.819. This also shows that the four indicators are valid. The fifth variable, business performance (X4), has all the indicators valid with the factor loading between 0.753 and 0.808. This shows that the five measurement items have met the requirements. Vendor competency as the last variable also has all the indicators valid as the factor loading value

between 0.780 and 0.858. This shows that the four measurement items have met the requirements. Based on Table 3 also demonstrated that value of cross loading and the composite reliability (C/R). The cross-loading assesses the discriminant validity of the indicators. The indicators are considered valid in term of discriminant once its loading factor is higher than its loading with another variable. Table 4 demonstrated that all the loading factors are higher than the loading with other variables, which means that discriminant validity is acceptable. The composite reliability value (C / R) is used to assess if the block indicators of each variable is reliable or not. Table 4 shown the value of each C/R is more significant than 0.7 as the minimum recommended acceptable value. Hence, it is concluded that the measurement model is considered valid in term of convergent and discriminant and reliable.

Table 4
Validity and reliability test

Construct and Indicator	Factor loading	Cross loading					C/R	Remark
		X1	X2	X3	X4	X5		
BPO Capability (X1)								
(X11)	**0.729**		0.480	0.480	0.428	0.505		Valid and reliable
(X12)	**0.827**		0.554	0.521	0.594	0.520		
(X13)	**0.861**		0.570	0.506	0.555	0.499	0.861	
(X14)	**0.694**		0.375	0.456	0.458	0.467		
(X15)	**0.592**		0.319	0.415	0.429	0.409		
Collaboration Practice (X2)								
(X21)	**0.642**	0.401		0.466	0.462	0.429		Valid and reliable
(X22)	**0.773**	0.529		0.563	0.573	0.609	0.797	
(X23)	**0.757**	0.447		0.561	0.551	0.512		
(X24)	**0.638**	0.375		0.388	0.299	0.518		
ERP Development (X3)								
(X31)	**0.819**	0.521	0.603		0.615	0.574		Valid and reliable
(X32)	**0.714**	0.391	0.474		0.515	0.518	0.819	
(X33)	**0.741**	0.513	0.526		0.496	0.454		
(X34)	**0.636**	0.433	0.459		0.407	0.614		
Vendor Competency (X5)								
(X41)	**0.858**	0.545	0.656	0.610		0.551		Valid and reliable
(X42)	**0.829**	0.641	0.640	0.686		0.608	0.888	
(X43)	**0.787**	0.533	0.544	0.510		0.514		
(X44)	**0.786**	0.359	0.543	0.585		0.521		
Business Performance (X4)								
(X51)	**0.763**	0.644	0.529	0.515	0.501			Valid and reliable
(X52)	**0.808**	0.638	0.606	0.607	0.605			
(X53)	**0.817**	0.510	0.534	0.563	0.521		0.891	
(X54)	**0.753**	0.361	0.477	0.536	0.523			
(X55)	**0.800**	0.419	0.533	0.541	0.503			

The subsequent analysis is to test the hypotheses, and the result are as shown in Table 5.

Table 5
Hypotheses test result

Hypothesis	Path Coefficient	Standard Deviation	t- statistics
BPO Capability -> ERP Development (H1)	0,252	0,122	2,065
BPO Capability -> Collaboration Practices (H2)	0,289	0,123	2,343
BPO Capability -> Business Performance (H3)	0,286	0,119	2,396
Vendor Competency moderates BPO -> ERP Development (H4)	0,133	0,067	2,002
Vendor Competency moderates BPO -> Collaboration Practices (H5)	0,080	0,046	1,723
Collaboration Practices -> ERP Development (H6)	0,262	0,116	2,248
Collaboration Practices -> Business Performance (H7)	0,273	0,129	2,108
ERP Development -> Business Performance (H8)	0,326	0,12	2,718

Nine hypotheses from ten are supported by the empirical data, as proved by the t-value higher than 1.96 (correlated value for the significant level of 5%). The first hypotheses, BPO capability influences the ERP development, is empirically proved as the t-value is 2.396. ERP development requires a capability to transform the upgraded business process into the ERP system. Two main capabilities are required. Firstly, capability to understand the latest upgrade of the business process, and secondly, the capability to translate the business process into the ERP system. This finding supports the hypotheses and also proved that in practices, the BPO capability is highly required to improve the business performance as the result of the business process.

The second hypotheses, BPO capability affects the collaboration practices, is proved as evidenced by the t-value of 2.343. When the business process owner (BPO) has adequate capability such as carrying out the authority given, managing the subordinate, and understanding the business process, it will improve the collaboration practices in term of ability to jointly succeed in ERP project, Shared capabilities to adjust the business process, knowledge sharing between vendors and BPO, and sharing information between vendors and BPOs. This finding is relevant with the fact that once the key user understands the business process and can manage the subordinate, it will result in better collaboration practices achievement. This finding is also in line with previous study conducted by Goff (2006) and Smith et al. (2011). Third hypotheses, business process owner (BPO) capability, influences the business performance, is supported as evidenced by the t-value of 2.396 obtained from the bootstrapping process. This value is higher than the minimum accepted value of 1.96. This finding is in line with previous study conducted by Parolia et al. (2013). BPO having capability to carry out the tasks and authority, to manage subordinates, and to understand the business process will improve the business performance.

Fourth hypotheses, vendor competency moderates the influence of BPO capability on the ERP Development, is supported as the t-value is 2.002. This moderating effect means that vendor competency positively reinforces the influence of the BPO capability on the ERP development. The higher the vendor competency, the stronger the influence of BPO capability on the ERP development. This finding suggests that in achieving an optimum ERP development result in term of conformity with the company's operational system, completeness of data integration between functions, the suitability of ERP software, and hardware ERP suitability, it requires both the BPO capability and the Vendor competency simultaneously. The fifth hypotheses, Vendor Competency, moderates the relationship of BPO and collaboration Practices, is not supported as the t-value of 1.723 is less than 1.96. It shows that the vendor competency is not significantly moderate this relationship. This finding indicated that the hypotheses is not proved as expected. The possible argument for this finding is that the success

of the collaboration is primarily determined the ability to manage the teamwork between the parties. While the vendor competency was assessed using technical skills, affordable costs, reputation owned, and vendor expertise. Based on these indicators, it is rational and logic that the vendor competency did not moderate the influence of the BPO on the collaboration. Sixth hypotheses, Collaboration Practices affects ERP Development, was supported by the empirical data as the t-value is 2.248. This finding is in line with previous study by Chakrabarty and Whitten (2011), and Das and Grover (2018). ERP system integrates all the business process of an organization. The development of the ERP system should involve all the function of the organization. A collaboration among all functions and the vendor has to be managed in order the ERP development succeed as expected (Aubert et al. 2013).

Next hypotheses, collaboration affects the business performance, is supported by the empirical data as the t-value is 2.108. This finding supports the study conducted by Cetinkaya et al. (2014) and Das and Grover (2018). Since the business process integrated several functions within organization, the collaboration of those functions become a mandatory to ascertain the success of business performance. Collaboration practices is actualized in term of the ability to succeed in ERP projects, adjust business processes with ERP systems, share knowledge between the two parties, and share information between the two parties, will imply on the business performance in term of inventory level control, order fulfillment, delivery management, data reporting in the company, and increased customer satisfaction. The last hypotheses, ERP development, affects the business performance. This finding is proved, as evidenced by the t-value of 2.718. This finding also supported the previous study by Shao et al. (2017), and Rajan and Baral (2015). When ERP system is upgraded regularly following the business process improvement. The ERP development make sure the on-going ERP system conforms with the company's operational system, appropriate data integration between functions, the suitability of ERP software and hardware. At the end, the overall process integration will improve the business performance.

Other interesting findings from this study are the mediating role of the collaboration practices and the ERP development. The research model of this study has introduced the presence of mediating role from the collaboration and the ERP development. The result of this study indicated that mediating effect are present. This effect is evidenced by the fact that the direct impact on all the relationship is supported. Based on this result, the presence of the mediating role is supported by empirical data. BOP capability provides positive impact on the business performance through direct and indirect effect simultaneously. This study supports research conducted by Kohlbacher and Gruenwald (2011) which states that business process owners can improve business performance. The indirect effect is obtaining through the mediating role of collaboration practices and ERP development. This finding demonstrated that the BPO capability is highly essential in improving the business process from supply chain management. This finding suggests that the company willing to improve the business performance improve the BPO capability, and in the same time implement the collaboration practices and upgrade the ERP system to always confirm with the on-going business process. Finally, this study provides an insight for the manager within the manufacturing company how to improve the business performance in the perspective of supply chain management. This study also enriches the recent theory in the supply chain management.

5. Conclusions

The research model has proposed eight hypotheses to be investigated. The result supported seven from eight hypotheses. BPO capability influences the ERP development. BPO capability affects the collaboration practices. Business process owner (BPO) capability influences the business performance. Vendor competency moderates the influence of BPO capability on the ERP development. Vendor competency did not moderate the relationship of BPO capability and collaboration practices. Collaboration practices affects ERP development. Collaboration affects the business performance. ERP development affects the business performance. The other interesting

finding is the mediating role ERP development and collaboration practices on the relationship between BPO capability and the business performance. The result of this research provides an insight how to enhance the business performance. It is essential for the organization to have the business process owner be highly capable in mastering their function. Besides, the organization should upgrade their ERP system to accommodate the new business process. Also, the management should exercise the culture of cross-functional collaboration and external collaboration as well. Once this model has been established, the management could expect a sustainable business performance. The managerial implication of this study is an insight for the manager how to improve the business performance in the perspective of supply chain management.

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