Factors affecting suppliers' capacity in outsourcing: a study of the Water and Wastewater Company of Iran

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Abstract

What are the major factors able to increase the capacity of suppliers in outsourcing processes? To answer this research question, a three-round Delphi survey was administered to an expert panel composed of 50 industrial experts of the Water and Wastewater Company (WWC) in Iran. The administered questionnaire – based on 50 items categorized into 4 groups: judicial-legal, contract, management, and financial – was developed based on prior literature and experts' answers. Respondents have been asked to evaluate each item with regard to the capacity of suppliers in outsourcing processes on a 5-point Likert scale. Factor analysis, one-sample t-test and the Friedman test were used for data analysis. Results show that the factor categories able to increase the capacity of suppliers in outsourcing processes at WWC are the following, in order of importance: financial, judicial-legal, contracts, and management. The findings help to focus on the shortcomings and deficiencies of current outsourcing processes.

Keywords: water industry; wastewater industry; outsourcing; supplier capacity; Iran; Delphi.

1. Introduction

Outsourcing, as postulated in management and organization studies, is the set of practices adopted by companies or public bodies to resort to other companies, through agreements, to carry out some phases of their production or support processes (Quinn, 1994). Outsourcing is usually implemented when outside organizations can do these activities faster, cheaper, or better than focal organizations, with benefits for the latter in terms of reduced costs, flexibility, expanded services and expertise that, in turn, allow them to refocus their resources on their core business (Lankford and Parsa, 1999). However, outsourcing is not easy to be implemented and requires a well-defined and organized plan (Tsai et al., 2012); indeed, if not well conducted, it may increase the cost to an organization (Quinn, 1999). Therefore, prior to outsourcing, it is necessary for management (and consultants) of the organization to undertake rigorous outsourcing analyses build strong outsourcing analyzes (Rajesh et al., 2012).

Among these analyzes, the most important, as highlighted by Barthelemy (2003), should be devoted to: *1)* identify the outsourcing activities that should be outsourced, and *2)* select the right vendor (see also Khalili et al., 2014). Mutually, suppliers also seek to accept outsourcing of processes from organizations that have high quality processes, strategies, and relationships with their suppliers, and fulfil all of their obligations (Wadhwa and Ravindran, 2007). From that, a dialectical relationship emerges between companies that outsource their activities and suppliers that take charge of these activities, with their decision-making paths following a co-evolutionary logic (Abatecola et al., 2018; Cristofaro, 2019; 2020). However, this dialectical relationship has become more and more stressed since the end of the 90s by the growing trend of big organizations that outsource their activities in order to raise the quality of their core products and/or services (Deloitte, 2018). This has happened due to the sudden upturns and downturns of demand supply led by an increase in turbulence within industries; if these changes

are not adequately managed by firms in charge of outsourcing, they can damage the sales of client organizations and compromise supply chain profits (Adida and Perakis, 2014). Hence, suppliers are asked to work to efficiently assist companies with outsourcing activities (De Kok, 2000) and help in remedying difficulties in big organizations (Khosravi et al., 2020; Sarvari et al., 2020).

However, academic studies on outsourcing have not focused attention on *quantitatively categorizing and ranking factors able to increase the capacity of suppliers in outsourcing processes*. For example, Ketler and Walstrom (1993) found through the reporting of some qualitative examples that the main factors influencing outsourcing processes could be: (1) personnel, (2) economic, (3) control, (4) data characteristics, (5) organizational characteristics, and (6) vendor and contract issues. Yet, the extensive review of Lacity et al. (2017) of 430 articles on outsourcing between 1992-2014 show that service improvement, quality increase, flexibility, and access to latest technology are at the basis of outsourcing decisions of big organizations, but nothing has been said about the suppliers' side (see also Adida and Perakis, 2014). In this last regard, Rezaeisaray et al. (2016) found – by proposing a new hybrid multi-criteria decision-making approach based on data of a Pipe and Fittings company – that business development, focus on basic activities, and order delays are the three most important criteria for selecting suppliers for outsourcing. Relatedly, Hanafizadeh and Zare Ravasan (2018), while analyzing the factors that are beneficial for supporting outsourcing operations in the information technology industry, found that the cultural fit between client and supplier as well as the power of the latter (see also Magnani et al., 2019) are variables that can positively influence outsourcing decisions.

From what has been reported – to the best of authors' knowledge – the management and organizational literature on outsourcing including the *International Journal of Operational*

Research, has been mainly focused on discovering how to select the right suppliers (Aggarwal and Singh, 2018; Mostafa and Eltawil, 2019; Torres-Ruiz and Ravindran, 2018; Rashid et al., 2018), and debating single elements that can influence the success of failures of outsourcing without implementing a comprehensive categorization and ranking of these factors. With the latter element unexplored, the following research question is proposed: *What are the major factors able to increase the capacity of suppliers in outsourcing processes?* Answering this question is pivotal to identify how suppliers may develop (Bai and Sarkis, 2016) and influence the 'maker-or-buy' decision of big organizations to resort to outsourcing or to extend their internal capacity with economics and financial benefits for the entire supply chain (Lee and Hsu, 2004; Tsai and Lai, 2007).

To respond to the above research question, a case of the Water and Wastewater Company (WWC) of Iran has been considered, which has been established to organize the official activities of the Ministry of Energy in Water & Wastewater affairs, which consists of 34 urban water and wastewater companies and 30 rural water and wastewater companies; because of its huge dimensions, it is one of the leading companies that outsources activities in the country (NWW, 2020a). Firstly, to identify the factors affecting the increase of suppliers' capacity in outsourcing, the existing literature (Asadi et al., 2018; Lee et al., 2019; Liu and Yuliani, 2016; UmaDevi et al., 2012; Yang et al., 2007) has been thoroughly studied culminating in a list of 50 factors that can affect suppliers' capacity in outsourcing. Then, the Delphi technique was used to delineate and match the identified factors based on the research literature with the current situation in Iran. Lastly, the final questionnaire was administered to 50 experts (managers, financial managers, technical advisors, and executives) and the data were analyzed; factor analysis, one-sample t-test and the Friedman test were used to confirm these factors and prioritize them. Results indicated that factors belonging to the judicial-legal, contract,

management, and financial group of factors can be considered as affecting the increasing suppliers' capacity in outsourcing processes. Findings of this study can undoubtedly help public agencies to develop the outsourcing process framework for assigning work to the private sector by addressing the shortcomings and deficiencies of current outsourcing processes.

The roadmap of this study is as follows: first, the theoretical background about outsourcing and factors affecting outsourcing processes is offered to readers. Then, the methodology is detailed with foci on: *a)* research design and procedure, and *b)* questionnaire and preliminary data analysis. The results are subsequently reported, while their discussion and emerging implications for practice and theory conclude the contribution.

2. Theoretical background

2.1. Outsourcing

Outsourcing is a conscious, thinking-based business decision adopted by companies or public bodies to outsource domestic work to an external supplier (Quinn, 1994: Lankford and Parsa, 1999) and involves providing some of the goods and services needed by a contracted business from an outside supplier (Verwaal, 2017; Yang and Chen, 2006). In general, outsourcing is traditionally known as the purchase of products or services and includes contractual outsourcing of internal business to external, inbound or outbound suppliers (McIvor et al., 2009; Wu and Park, 2009). From time to time, outsourcing has been used as a strategic practice by big organizations to become more flexible to re-focus on their core business; however, recently, SMEs (and start-ups; see Bustamante, 2019) have also found benefits from outsourcing, with respect to SMEs not be in the habit of outsourcing usually, in terms of cost reduction, as recently advanced by Edvardsson et al. (2019) while investigating strategic outsourcing among Icelandic SME service firms from 2009 to 2018. Hence, as companies continue to seek to enhance their

competitive advantage to increase profitability and market share, researchers consider outsourcing as one of the key strategies to promote competition and market performance (Verwaal, 2017). Due to its proved strategic role, Power et al. (2006) composed and detailed an outsourcing life cycle model, as exposed in Figure 1.

Insert Figure 1 about here

In particular, the outsourcing life cycle is made up of the following stages (each one with sub-components and sub-processes that need attention): *i)* strategic assessment (i.e., the initiative must be evaluated in the context of the strategic position of the organization, and the intended benefits of employing outsourcing as a strategy should be clearly identified), *ii)* analyze needs and choose activities (i.e., identify the peculiarities of the given project, evaluate the requirements, and prepare a proposal to articulate these needs to potential vendors), *iii)* evaluation of suppliers (i.e., define criteria to assess vendors, and procure and consider their proposals), *iv)* negotiation and signing of contracts (i.e., composition of the outsourcing contract), *v)* project initiation and transition (i.e., the client organization slowly starts to delegate control of the work to the outsourcing vendor), *vi)* relationship management (i.e., being updated with the progress of the project and solving emerging problems), and *vii)* review the process for making a decision to continue with outsourcing, modify the contract or build an exit strategy (i.e., evaluate its current outsourcing contract to see if its best interest lies in continuing, modifying or exiting the relationship).

Depending on how the above-described outsourcing life cycle is managed, the outsourcing process can lead to positive or negative outcomes. In this vein, a stream of outsourcing studies has been conducted to evaluate the performance of outsourcing on both the client firm and supplier sides (Arroyo-López et al., 2012; Lee et al., 2018; Sharda and Chatterjee, 2011). For

instance, according to Sharda and Chatterjee (2011), firms that implement outsourcing practices are associated with better organizational performance in terms of: growth in employment, growth in clients, growth in offered processes, cost-effectiveness, reduction of the need for investment, focus on key areas of the organization, and increase in flexibility (Bals and Turkulainen, 2017; Lee et al., 2019; Lowson, 2001). Similarly, regarding the effect of outsourcing processes for the supplier, Lee et al. (2018) noted that collaborative communication positively influences the supplier's performance. In contrast, other studies highlighted that outsourcing may not always lead to a positive outcome for the client organization, as demonstrated by the study of Patel et al. (2019). In particular, these authors found, through the investigation of the Human Resource (HR) function of a German subsidiary of a US multinational company, that the outsourcing of the HR function led to a decrease in flexibility of the function itself, a slowdown in activities' processing time as well as a decrease in satisfaction and work intensification for HR managers.

In sum, there is an unresolved question about who benefits from the outcomes of strategic outsourcing, underlining its negative implications; as for other management and organizational phenomena, academic literature has investigated the conditions and variables that lead to the former or latter results and a summary is reported in the following sub-section.

2.2. Suppliers' selection and factors affecting outsourcing processes

One main stream of outsourcing studies focused on discovering under which conditions this practice can lead to advantages or disadvantages and has been focused on how to select, mainly proposing econometric models, *the right supplier* (Asadi et al., 2018; Delen et al., 2019; Hassanain and Al-Saadi, 2005; UmaDevi et al., 2012; Yang et al., 2007).

On one hand, this problem has been approached by investigating only supplier-related variables. Aggarwal and Singh (2018) proposed, for supplier selection, a revised data envelopment analytic hierarchy process (RDEAHP) that overcomes DEAHP drawbacks, such as using counter intuitive priority vectors for inconsistent pair wise comparison matrices. On the other hand, sometimes the supplier selection is seen as part of the broader production-inventory-distribution-routing problem, requiring more sophisticated mathematical solutions aimed at redesigning the location of the entire supply chain network, with due consideration of inventory costs for retailers and response time costs for suppliers (see Rashid et al., 2018). Due to the number of variables to consider when extending the view to the entire supply chain, the selection of suppliers has been recently approached as a combinatorial optimisation problem, as done by Mostafa and Eltawil (2019). These authors, for example, successfully introduced (in terms of reduced computation time for lot sizing without a significant effect on the quality of the solutions found) valid inequalities for a problem with a single plant, multiple products and multiple heterogeneous vehicles. Despite these advancements, supplier selection in outsourcing has become increasingly complex due to the access to a global supply that brings opportunities, in terms of access to a broader audience of suppliers and increase of their competition, and threats, in terms of increased transportation distance (with associated risks for conveyed goods) and environmental consequences. In this vein, Torres-Ruiz and Ravindran (2018) proposed a multi-objective order allocation model for selecting primary and backup suppliers, in a global supply chain setting, allowing the minimization of: product costs, transportation costs, the cost of exceeding CO_2 allowances, lead-time opportunity costs, sustainability risks, and greenhouse gas (GHG) emissions.

However, despite the above-discussed more or less sophisticated means for supplier selection, many outsourcing projects have failed without reaching the established goals (Delen

et al., 2016; Liu and Yuliani, 2016). In this regard, outsourcing literature, also synthesized in Table 1, identified a number of reasons to explain these failures, such as: service cuts, failure to reduce costs, and disputes of outsourcing contract parties (Bahli and Rivard, 2017; Bak, 2018). However, some failures are due to the complexity and uncertainty of the outsourcing process; for example, Bayazit (2006) attributes this issue to incorrect or poor management of the outsourcing organization.

Insert Table 1 about here

In this vein, some scholars (Derakhshonpour, 2018; Embleton and Wright, 1998; Yang et al., 2007) identified factors that could influence the outsourcing of business processes, finding the following: cost savings, focus on core competencies, flexibility, information security, lack of management control, labour unions, ethical issues, and quality of service providers. UmaDevi et al. (2012), instead, acknowledged three categories of influencing variables on outsourcing: cost metrics (unit price, shipping cost and warranty costs), relationships (years of contact, attitude, trust), agility (ability to respond to demand changes, both in volume and design), and avoidance of delay in delivery and quality. On the relationship side, it has been proved that the empathy capability of the supplier to place himself in the position of the client increases the chance of strategic outsourcing project success, while a low empathy decreases the chance of success (Delen et al., 2019) and – because of the importance of a direct relationship between the supplier and the client in strategic outsourcing – not hiring an intermediate increases the chances of successful outsourcing projects; this was found by Delen et al. (2016) in their analysis of a sample of Dutch IT-outsourcing success and failure projects. Yet, Shafie Nikabadi and Hoseini (2019) built a model for strategic outsourcing, based on data collected in a three-year period (2016-2019) in the power industry in Iran, highlighting that, for

completing projects in an organization, outsourcing based on a number of contractors is more effective than frequent use of one contractor. In addition, the quality of outsourcing projects could be improved by training new employees using employees that already have the expertise and skills (thus, through internal cooperation). Through a recent investigation of outsourcing projects in the Nigerian pharmaceutical industry through a Delphi study, Aigbavboa and Mbohwaby (2020) found that "organizational inadequacies" (consisting of sub-variables such as 'loss of expertise', 'corporate governance', 'undertrained vendor employees', and 'loss of control of outsourced function') and "goal under-realization" (consisting of 'service levels not achieved', 'loss of flexibility', 'hidden costs' and 'cost reduction not realised') are the two main variables that lead to the failure of outsourcing projects.

3. Research methods

3.1. Introduction of the Water Wastewater Company

Before explaining the data collection, it is worth introducing the WWC and its suitability with the goal of this research. Established in 1992, the Iranian Water and Wastewater Company is a government-owned subsidiary of the Ministry of Energy: "the main purpose of establishing the concerned company is to organize the official activities of Ministry of Energy in Water & Wastewater affairs including the correct management of subsidiaries companies in the policies of Ministry of Energy" (NWW, 2020a). WWC consists of 34 urban water and wastewater companies and 30 rural water and wastewater companies, with 2,794,888 cubic meters per day in terms of volume of collected wastewater and 5,425 million cubic meters per year in terms of total volume of produced water (NWW, 2020b). Due to this huge capacity, WWC is one of the leading companies outsourcing activities in Iran (Farhangi et al., 2019) – a country that has been already proved to be a territory in which outsourcing is used in strategic terms (see Shafie

Nikabadi and Hoseini, 2019). In particular, activities outsourced by the Water and Wastewater Company include five different areas: *1)* Outsourcing of engineering and development activities (e.g., water and wastewater piping, drilling of water wells, construction of water and sewage pumping stations, and construction of water resources); *2)* Outsourcing of operational activities (e.g., installation and maintenance of pipe splitting, and disaster relief); *3)* Outsourcing of financial and supporting activities (e.g., purchasing, green space maintenance, and cooking of staff meals); *4)* Outsourcing of human resource activities (e.g., staff training); and *5)* Outsourcing of marketing activities (e.g., water bill distribution, customer tracking).

3.2 Research design and procedure

The purpose of the present study is *to evaluate the factors affecting the increase of suppliers' capacity in outsourcing for companies that heavily rely on outsourcing*. The Delphi method, centred on the opinions of core project stakeholders in the WWC about the factors affecting the increase of suppliers' capacity in outsourcing, was used to achieve this goal. Due to the intention of soliciting the perceptions of key stakeholders in the WWC, the Delphi method was employed via a structured questionnaire; the resulting questions emerged from the literature studied and interviewees' initial responses (as has been done in similar works; see Khosravi et al., 2020; Savari et al., 2020). The study adopted a purposive sampling technique (Olawumi et al., 2018) for the selection of respondents, obtaining the opinion of 50 experts during three-rounds of the Delphi survey. The target respondents for the current study include clients, consultants, and main contractors within the WWC in Iran. Respondents contacted through the Delphi study come from different business entities within the same company, but the respondents' expressions are from different points of view of the same phenomena. Survey participants were all well-experienced professionals with knowledge in the water and

wastewater industry; accordingly, their opinions were considered reliable and representative, reflecting the true perceptions of outsourcing practices in the construction industry.

Insert Table 2 about here

Table 2 shows the socio-demographic characteristics and respondents' professional sector. The sample size of the study (50 responses) was considered satisfactory and adequate (Chan et al., 2019; Osei-Kyei and Chan, 2017). The initial questionnaire was developed based on review of past literature on the outsourcing process of capacity building of water and wastewater suppliers.

Insert Figure 2 about here

As shown from the methodology process exposed in Figure 2, during the first round of the Delphi survey, experts responded to the questions to confirm or reject the items that emerged from the literature. They were also asked to identify the elements that may have been missing. The second questionnaire was developed and distributed among the experts after reviewing their opinions. Based on the comments received at this stage, the questionnaire was again examined and the final questionnaire was formulated with 50 items in 4 groups (judicial-legal, contract, management, and financial). During the third round, experts answered the questions based on a five-point Likert scale with 1 being "strongly agree" and 5 being "strongly disagree". The analysis of this study was performed using SPSS statistical software at two levels of descriptive and inferential statistics. In the descriptive statistics section, statistical characteristics, such as frequency, percentage, mean and standard deviation, were used, and in

the inferential statistics section, the Kolomogorov-Smirnov test, one-sample t-test and Friedman test were used.

3.3. Questionnaire and preliminary data analysis

The final questionnaire was drawn up by reviewing the research literature and from experts' opinions on face and content validity, and administered via three rounds of the Delphi technique. The reliability of responses was calculated using Cronbach's Alpha (similarly to other studies; Sarvari et al., 2020). In particular, face validity refers to the extent to which a test appears to measure what it is intended to measure; most people would agree that the test items appearing to measure what the test is intended to measure would have strong face validity (Johnson, 2013). Content validity, instead, exists in a questionnaire when the items are about what is being measured and when the items encapsulate what is relevant to the construct being measured (Preedy, 2010). For the content validity of the questionnaire, the Content Validity Ratio (CVR) and the Content Validity Index (CVI) were calculated. CVR is used in order to measure content validity based on experts' opinions; to calculate it, firstly, the aim of the test is explained to the experts who were then asked to score each item using the Likert scale between "necessary item", "useful but not necessary item" and "unnecessary item". The CVR was then calculated using equation (1):

$$CVR = \frac{\left[n - \frac{N}{2}\right]}{\frac{N}{2}} \quad (1)$$

Where 'N' is the total number of experts and 'n' is the number of experts who have selected the "necessary item" option. The minimum acceptable CVR value for a total of 10 experts is equal to 0.62 (Pezshki et. al., 2017). Items with CVR values lower than this threshold should be eliminated from the test due to lack of suitable content validity. Then, experts were asked to

score each item regarding its Relevance, Simplicity, and Clarity using a 4-level Likert scale. The experts scored the Relevance using 1 ("irrelevant"), 2 ("Somewhat relevant"), 3 ("relevant"), and 4 ("fully relevant"). Simplicity was also scored using 1 ("not simple"), 2 ("Somewhat simple"), 3 ("simple") and 4 ("simple and relevant"), while Clarity was scored using 1 ("unclear"), 2 ("Somewhat clear"), 3 ("clear") and 4 ("clear and relevant"). The Content Validity Index then was calculated using equation (2):

$$\text{Content Validity Index (CVI)} = \frac{\text{Number of experts giving 3 and 4 scores}}{\text{total number of experts}} \qquad (2)$$

The minimum acceptable threshold for CVI is 0.79 and items with scores below this threshold are eliminated (Pezshki et al., 2017; Fadavi-Ghaderi et al., 2017). In order to measure face validity of the items, the item impact score test is used. In order to calculate item impact scores, firstly, participants were asked to score the importance of each item in the questionnaire using a 5-level Likert scale from 1 ("Not important at all"), 2 ("a little important"), 3 ("Somewhat important"), 4 ("important"), and 5 ("very important"). Secondly, impact score was calculated using equation (3):

$$\text{Impact Score} = \text{Frequency (\%)} \times \text{Importance} \qquad (3)$$

The face validity value of items must not be below 1.5 and only items with impact scores higher that 1.5 were retained (Fadavi-Ghaderi et.al. 2017). The results of face and content validity evaluations showed that all items have suitable face and content validity scores. Yet, the reliability of the items was investigated and items with low reliability are removed in order to improve the overall reliability of the test. Various methods are used to measure reliability. In this study, Cronbach's Alpha coefficient was calculated using SPSS software. The Cronbach's Alpha value must be higher than 0.7 (Taber, 2018). The Cronbach's Alpha value calculated in the current study was 0.916, which indicates that all items have suitable reliability.

Table 3 shows the items and their distribution within 4 groups, thus the output of the above-described process. According to Table 3, the management group is comprised of 23 items; the most important in terms of items. The financial group has 7 items; the judicial-legal and contractual groups have, respectively, 8 and 12 items. During Delphi rounds, the face and content validity of the questionnaire was confirmed using experts' opinions.

Insert Table 3 about here

Factor analysis was used to evaluate the construct validity of the questionnaire using SmartPLS software. First, the fit of the measurement model was evaluated using index reliability (a useful indicator to compute the failure probability of a test), convergent validity, and discriminant validity. The underlying idea of convergence validity, whose evidences support construct validity, is that related construct tests should be highly correlated (Preedy, 2010). Discriminant validity, instead, is the process for identifying whether concepts or measurements that are not supposed to be related are actually unrelated (Cohen and Swerdlik, 2005). The reliability of the index was assessed by three criteria (factor loadings' coefficients, Cronbach's Alpha coefficient, and composite reliability). The first factor to consider when evaluating the model is the one-dimensionality of the model indices; this means that each index, along with the other indices, must be loaded with a single large factor load, with only one latent variable. For this purpose, the load factor must be greater than 0.5; and factor loadings less than 0.3 should be omitted from the set of indices (Shiau et al., 2019). The results in Figure 3 show that the factor loadings of all questions are above 0.3. Therefore, all questionnaire items were retained.

Insert Figure 3 about here

Cronbach's Alpha coefficient is commonly used to indicate the reliability of research (Lin and Kim, 2020; Singh, 2017) and is used to evaluate the reliability of the model's internal consistency, ranging from 0 to 1. In particular, a Cronbach's Alpha value above 0.7 is an acceptable reliability indicator (Van Griethuijsen et al., 2014). Table 4 shows that all Cronbach's Alpha values exceed 0.7, which represents high reliability of the questionnaire.

Composite reliability was introduced by Wetzels et al. (2009) and its assumed superiority over Cronbach's Alpha comes from the fact that the reliability of the structures is calculated not by absolute terms but by the correlation of their structures with each other. If the composite reliability value for each construct is above 0.7, it indicates a good internal reliability for the measurement model, and a value less than 0.6 indicates no reliability (Raykov, 1997). The Composite Reliability (CR) value is calculated as:

$$CR = \frac{[(CF_1)^2 + \ldots + (CF_n)^2]}{[(CF_1)^2 + \ldots + (CF_n)^2] + [(1 - CF_1)^2 + \ldots + (1 - CF_n)^2]} \qquad (4)$$

Note: *CF* – factor loading of every item, *n* – number of items in a model. See Awang (2016) for more details about the computation of the formula.

Table 4 shows that the composite reliability (CR) for all constructs was above 0.7. To verify the convergent validity of the variables, each latent construct's Average Variance Extracted (AVE) value was calculated; the AVE measures how much variance is captured by a construct in relation to the amount of variance due to measurement error. The AVE value should be greater than 0.50, indicating that the lowest 50% of the variance from the observed variable should be taken by the latent constructs in the model (Fornell and Larcker, 1981). The average variance extracted for each construct was calculated by Equation (5); the Average Variance

Extracted (AVE) values (ranging from 0.559 to 0.612; Table 4) are greater than 0.5, so convergent validity is acceptable.

$$AVE = \frac{[(CF_1)^2 + \ldots + (CF_n)^2]}{n} \quad (5)$$

Note: *CF* – factor loading of every item, *n* – number of items in a model.

Insert Table 4 about here

As can be seen in Table 4, Cronbach's Alpha values and composite reliability for all variables are greater than 0.7, and convergent validity value for all variables is greater than 0.5, so the model reliability is desirable. This means that the model has internal consistency; predictor variables contribute sufficiently to the model predictiveness.

The discriminant validity was evaluated using the Fornell-Larcker criterion (Fornell and Larcker, 1981). It compares the square root of the AVE values with the latent variable correlations. A latent component explains better the variance of its own indicator rather than the variance of other latent components. Therefore, the square root of each component's AVE should be greater value than the correlations with other latent components (Hair et al., 2017). Table 4 shows the results of the Fornell-Larcker criterion assessment with the square root of the reflective components' AVE on the diagonal and the correlations between the components in the off-diagonal position. Since the results indicate that the square root of AVE is larger than the correlation between any component pair (as presented in Table 4), it was concluded that the discriminant validity for the components had been obtained.

R^2 is also a criterion used to connect the measurement and structural components of structural equation modelling and shows the effect that an exogenous variable has on an endogenous variable (Kääriäinen et al., 2020). The value of this coefficient also varies from 0 to 1, with

larger values being more desirable. Fobang et al. (2019) stated acceptable value R^2 equal to 0.25. The values (communality) used for the criteria goodness-of-fit (GoF) index and R^2 used for the dependent variable in this study are reported in Table 5. The values obtained for R^2 indicate the optimal fit of the structural model; moreover, R^2 substantially grows when adding all the four macro-categories of factors influencing outsourcing practices, meaning that all are important for the explanation of the phenomenon.

Insert Table 5 about here

The predictive relevance (Q^2) of the model, introduced by Stone (1974) and Geisser (1975), determines the predictive power of the model. They believe that models with acceptable structural fit should be capable of predicting indices of endogenous model structures. This means that if the relationships between structures are correctly defined in one model, the structures will be able to influence each other adequately (Sarstedt et al., 2017). Henseler et al. (2009) set three values of 0.02, 0.15, and 0.35 to indicate, respectively, weak, medium and strong predictive power of the construct.

Considering the Q^2 value in Table 5, it can be concluded that the prediction power of the model is good and overall the model is perfectly able to predict the phenomenon. In order to determine the influence of an exogenous variable on an endogenous variable, the effect size f^2 was evaluated. This criterion indicates the change in R^2 if a specific exogenous variable is included in or excluded from a model (Hair et al., 2017). It can be calculated as:

$$f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}} \quad (3)$$

The f^2 values of 0.02, 0.15, and 0.35 represent, respectively, the size of the weak, moderate, and strong effect of a structure on another structure (Cohen and Swerdlik, 2005). So, this criterion can be applied to all variables in the model. As shown in Table 5, the effect size for

judicial-legal, contract, financial, and management factors on suppliers' capacity in outsourcing was 0.920, 0.600, 0.917 and 0.590, respectively; thus, effect size ranges from medium (>0.5) to large (>90) (Cohen and Swerdlick, 2005), meaning that the relationship among variables is strong. Hence, the f^2 of all four exogenous latent variables on suppliers' capacity in outsourcing have a strong effect on the values of R^2, which indicates that the selected factors are key determinants that affect capacity of suppliers in outsourcing processes.

4. Findings

4.1. Testing the normality of the distribution of research data

The GoF index is applied for the complete model fit to verify that the model sufficiently explains the empirical data (as done in similar research; see Alaloul et al., 2020). The GoF ranges between 0 and 1, and values of 0.1, 0.25, and 0.36 indicate, respectively, low, medium, and strong global validation of the path model (Wetzels et al., 2009). The GoF is the geometric mean value of the average communality (AVE values) and the average R^2 values, and the GoF of the model is calculated by Equation (6).

$$\text{GoF} = \sqrt{\overline{AVE} \times \overline{R^2}} = \sqrt{0.732 \times 0.579} = 0.656 \qquad (6)$$

The GoF value for the present model is 0.656 showing that the overall model has goodness-of-fit; this provides a strong global validation of the path model (Cohen and Swerdlik, 2005). The Kolmogorov-Smirnov test was used to check the normality of the main variable of the study. In particular, the Kolmogorov-Smirnov test is specifically designed for good fitness tests in which the theoretical distribution is continuous. Therefore, in the present study, before

performing significant tests, this test was used to check the normality of data distribution. Testing of assumptions is shown in Table 6.

H_0: The corresponding variable data has a normal distribution.

H_1: The relevant variable data does not have a normal distribution.

Insert Table 6 about here

As the results of Table 6 show that the level of significance in the outsourcing development variable for supplier capacity building is greater than 0.05, the null hypothesis in this variable is confirmed at 95% confidence level and the distribution of data in the research variable follow the normal distribution; so, the distribution is symmetrical and follows a probability bell curve. Therefore, parametric tests are used to evaluate the data.

4.2. Factors contributing to increasing the capacity of suppliers in outsourcing processes

A t-test was used to explain and interpret the factors influencing suppliers' capacity building in the outsourcing process. In particular, the one-sample t-test is used to evaluate the degree of homogeneity or the similarity and non-similarity of the sample mean with the mean of the population in a situation where the standard deviation of the population is unknown. As the t-distribution for small samples is adjusted using degrees of freedom, this test can be used for very small samples. In other words, the one-sample t-test is used to test the hypothesis of comparing the average of a sample with a certain value, which follows the t-test statistic with (K) degree of freedom. If the p-value is greater than 0.05, the variable under study does not have a significant difference with the test value (mean value) and, as a result, the factor under study is average in the statistical population; if the p-value is less than 0.05, the variable under

study has a significant difference with the test value; if the mean of the factor under study was lower than the test number, the factor under study was weak in the statistical population.

According to Table 7, the average judicial-legal, contract, management, and financial components in outsourcing development to provide suppliers' capacity are 4.0, 4.0, 3.9, and 4.1, respectively. So, these are highly important clusters of factors due to the closeness of this mean to the maximum of the Likert scale (i.e., 5). Since the p-value is less than 0.05, therefore, outsourcing development to enable suppliers in the indicators (judicial-legal, contract, management, and financial) is significantly different from the test value (i.e., 3). On the other hand, given that the upper and lower limits of positive confidence intervals have been obtained, it can be concluded that the status of the outsourcing process for capacity building in water and wastewater suppliers is above average. The mentioned components can have a relatively strong impact on the development of an outsourcing process framework in the Iranian WWC for supplier capacity building in the WWC.

Insert Table 7 about here

4.3 Prioritization of factors able to increase the capacity of suppliers in the outsourcing process

The Friedman test was used to rank and determine the degree of importance of the components of outsourcing in order to build the capacity of suppliers in the eyes of the respondents, i.e., clients' (WWC) stakeholders. This non-parametric test is an extension of the Wilcoxon matched pairs signed ranks test, and covers more than two time periods of data collection or conditions and groups of three or more matched subjects (Cohen and Swerdlik, 2005). It is used to analyze the two-way variance by ranking method and to compare the average rating of different groups.

H_0: Average rank of components is equal.

H_1: Average rank of components is not equal.

The results of Table 8 show that the level of significance is $p < 0.05$, so it can be concluded that there is a significant difference between judicial-legal, contract, management, and financial components in outsourcing development. In other words, these four macro-categories contribute differently to the outsourcing practice.

Insert Table 8 about here

According to the Friedman test results (Table 9), the financial component with average rating 2.78 is ranked first, the judicial-legal component with average rating 2.49 is second, the contract component with average rating 2.43 is third, and management with average rating 2.30 is fourth in outsourcing development for supplier capacity building in the WWC. In other words, this ranking expresses, in specific terms, the differential importance of the identified macro-categories in influencing the outsourcing practice.

Insert Table 9 about here

5. Discussion

In explaining and analyzing the research results, it can be stated, first, that outsourcing has attracted the attention of many managers as a tool for increasing productivity, differently from the conception of the past. Indeed, in the past, water and wastewater outsourcing, for example, was used when organizations were not able to perform well, their competitiveness was weak, they were facing financial difficulties, or they were technologically inadequate (Farhangi Farghani et al., 2019; Shafie and Hoseini, 2019) in reducing costs and service provision waiting

time. In contrast, nowadays, water and sanitation companies are using this tool to build the key capabilities needed to meet customer needs (Khosvari et al., 2020; Sarvari et al., 2020).

Due to the highlighted importance of the outsourcing practice, this study tries to advance the factors that can illustrate how outsourcing projects become a success or failure. Findings of the proposed contribution show that the status of the outsourcing process to meet the capacity of suppliers in the WWC is above average and the components used are relatively robust in developing the outsourcing process framework. In addition, in the ranking of factors affecting the increase of supplier capacity in the outsourcing process, the financial component (2.78) is ranked first, the judicial-legal component (2.49) is second, the contract component (2.43) is ranked third, and management (2.30) is ranked fourth. These components, respectively, are assigned to outsourcing development in order to build supplier capacity in the WWC. Accordingly, the following elements that impact the capacity of suppliers in outsourcing practices emerge: *1)* reviewing and specifying legal deductions related to contracts, *2)* making accurate estimations of the transaction amount and its bases with respect to professional estimation approaches from the perspective of the employer and the contractor, *3)* using an appropriation method for calculating the potential damages to the client's facility caused by the external supplier, and *4)* trying to set transparent terms and conditions of payments.

Of course, what has been stated above about the financial macro-category does not mean that financial variables are the only elements that should be taken into account while making outsourcing agreements, but, it means that they have a sort of primacy among all issues. Indeed, for the legal macro-category, for example, the formulation of regulatory and legal remedies for outsourcing has been found to tremendously increase the capacity of suppliers in supporting outsourcing projects. The same applies, for the contract macro-category, with the transparency of outsourcing contracts in formulating the characteristics of outsourcing providers with regard

to expected services and, for the management macro-category, with the identification and investigation of outsourced activity problems before, during and after outsourcing. Therefore, it is necessary for managers responsible for outsourcing projects to carry out systematic thinking and coherent management of the outsourcing process (Choi and Cummings, 2016) to increase the productivity of the company and to achieve predefined strategic goals.

Results of this research are relatively consistent with those of prior studies. In fact, without however being comprehensive of all potential issues, the focus on financials already emerged as an important cluster influencing outsourcing projects from the study of a stream of scholars (Derakhshonpour, 2018; Embleton and Wright, 1998; UmaDevi et al., 2012; Yang et al., 2007) who found, in particular, that cost savings and cost metrics avoid delay in delivery. However, results are a bit in contrast with the ones of other scholars who found relationships with suppliers (Delen et al., 2019), empathy, (Shafie Nikabadi and Hoseini, 2019) and management-related issues (Aigbavboa and Mbohwaby, 2020), such as personnel (Ketler and Walstorm, 1993), are the main variables that lead to the success or failure of outsourcing projects. This discrepancy can be the result of a number of contextual variables in which the research has been conducted, such as investigating a big company with successful collaborations with the country's government that, theoretically, could imply the presence of already established outsourcing processes and reliable vendor-supplier relationships (Sharma, 2010). So, the life cycle of the outsourcing process and its routinization over time could lead to the emphasis on some set of variables over others (Chou and Chou, 2009; Power et al., 2006). Taking into account the results of this study, it can be advanced that financial and judicial-legal issues, usually under robust investigation during efficiency audits of organizations, are of main concern to big organizations with established outsourcing relationships.

6. Conclusions and implications

Among the fundamental changes in current organizations of their structure and behavior, there is the networking of their activities, mainly determined by outsourcing choices (Deloitte, 2018). However, despite the huge amount of literature produced, no studies – to the best of the authors' knowledge – have been focused *on quantitatively categorizing and ranking factors able to increase the capacity of suppliers in outsourcing processes*. In order to answer this question, the case of the Iranian Water and Wastewater Company has been considered, one of the leading companies in outsourcing in Iran – which, as with many other big companies, has always been faced challenges in choosing the right suppliers for outsourcing.

To fill the above-mentioned gap, a questionnaire was distributed among three groups of employees, consultants, and contractors from the 34 urban water and wastewater companies and 30 rural water and wastewater companies that form the WWC; with the wide circulation of the questionnaire, the different views enhanced the comprehension of the phenomena. The questionnaire was built by reviewing previous research literature and interviewing experts in this field in Iran; 50 items were assigned to 4 categories, i.e., judicial-legal, contract, management, and finance, that influence the capacity of suppliers in outsourcing processes, which were listed and evaluated on a 5-point Likert scale. The validity and reliability of the questionnaire were assessed and statistical tests were used to analyze the data.

Stemming from the literature on outsourcing practice, with specific reference to factors able to explain outsourcing projects' success and failure, the unique contributions of the paper lie in the inclusiveness of: the investigation of all the variables that can affect suppliers' capacity in outsourcing projects, their categorization according to macro-clusters, and their rank according to outsourcing projects' stakeholders. Among the four categories of factors influencing strategic outsourcing, the financial component is ranked first, the judicial-legal component is second, the

contract component is third, and the management one is fourth. In terms of theoretical implications, thanks to the proposed results, literature on outsourcing practice is advanced with reference to studies concerned with the factors influencing the success and failures of outsourcing projects. In particular, the proposed ranking, materializing from the interviewed experts, is consistent with the intuition of a stream of scholars (Derakhshonpour, 2018; Embleton and Wright, 1998; Yang et al., 2007) who assigned primary relevance to cost savings; especially to studies which advanced that financial motivations are the most important ones for initiating outsourcing projects (e.g., McLellan et al., 1998). Yet, in respect to these contributions, despite including a categorization of factors, a comprehensive consideration is proposed of all the variables influencing outsourcing practice, not focusing on a limited set of variables, such as contractual and external factors (e.g., Cabral et al., 2014). Results of this work, in terms of categorization of variables, want only to direct intelligent attention to the expense resources – this advances an attention-based view of outsourcing strategic practice (Joseph and Wilson, 2018).

In terms of practical implications, from the emphasis posed on the financial category of variables influencing outsourcing practice, it emerges that clarifying the pricing of supplier services and reaching a final price agreement will increase suppliers' willingness to perform outsourcing. However, to achieve this, successful outsourcing also requires a strong, independent executive team and an independent and trained unit, whose members are selected by the company's strategic committee. The team should be set up to handle outsourcing with specific groups of executives whose attention is devoted to the practice. Having this organizational structure for outsourcing practice will help to identify the services that need to be outsourced and enable clients and suppliers to agree on the capabilities, processes, and actions required for mutual service.

Since success in outsourcing processes in any public and private organizations depends on different and specific factors, future researchers can examine the effects of the above-identified categories across different private and public organizations and sectors. Doing that will help to overcome the main limitation of this paper, which was sampling just one sector and one (despite huge) organization in order to guarantee generalizability of results. By extending the scope of future research, the proposed categorizations can be differently ranked by involved experts, due to the specificity of the sector in which they operate. The same can emerge if future research extends the geographical scope of the study by involving organizations and sectors from different parts of the world that would allow a cross-cultural comparison of factors influencing outsourcing practice. Indeed, it may be, for example, according to the collectivist or individualist culture of a country, that the management category may be less or more important within outsourcing success or failure. This future research can be carried out by comparing Eastern with Western countries, or, developed and developing ones. It is also recommended that future researchers compare the quality of outsourced and non-outsourced services in the private and public sectors and examine the extent to which suppliers are satisfied with the outsourcing process. Another limitation, that can be a subject of future research, is not having studied the influencing factors of outsourcing with regard to the different stages of the outsourcing life cycle; this consideration can lead to different results due to the distinct emphasis that clients and suppliers can have within the pre-contract phase, contract phase, and post-contract phase (Chou and Chou, 2009). Finally, and maybe the most important future research development, the proposed four categories should be investigated to try to find their co-evolving connections (Abatecola et al., 2020; Cristofaro et al., 2019) to produce a framework able to explain how organizations can effectively manage some factors while considering the effects on the others.

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Figure 1 Outsourcing executive process (Power et al., 2006)

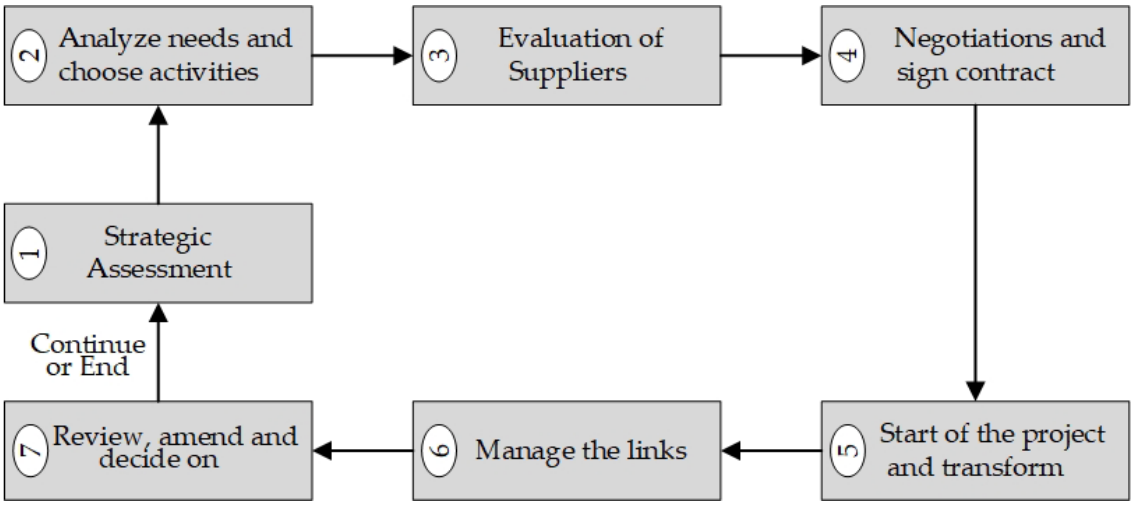

Figure 2 Research process framework

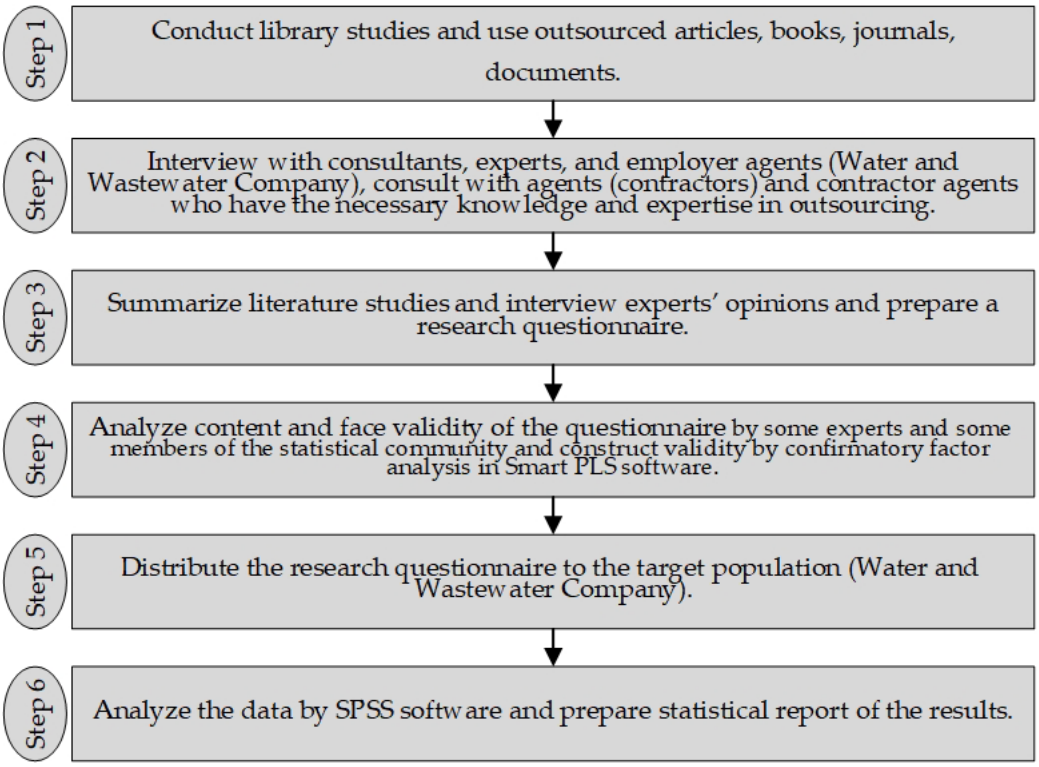

Figure 3 The measurement model and PLS results

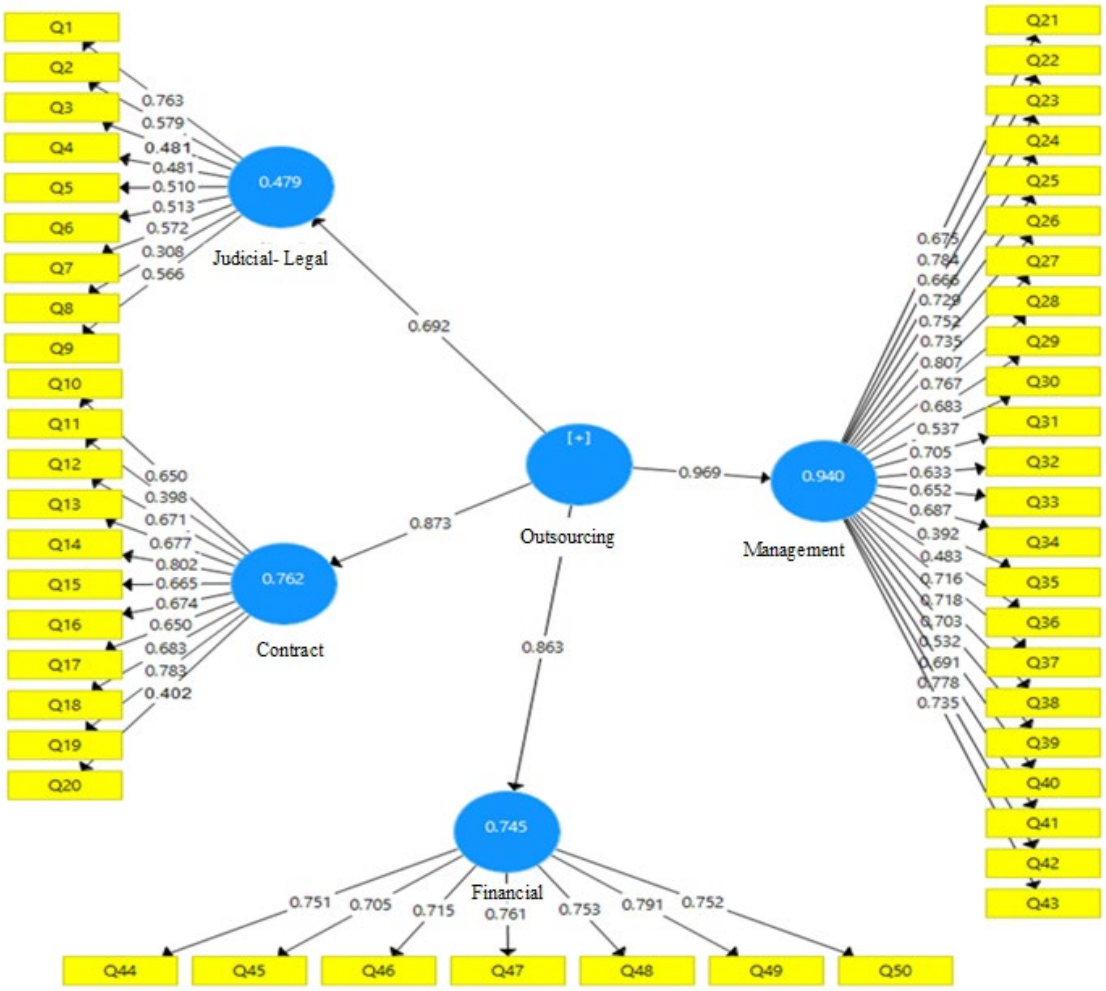

Table 1 Criteria for supplier selection, evaluation of outsourcing performance, and outsourcing success

Cluster of criteria	Reference	Factors affecting outsourcing success	Area
Outsourcing performance assessment	Sharda (2011); Arroyo Lopez et al. (2012); Lee et al. (2018)	Orientation in Corporate Management, Contract Management and Communications Management, Reduce Employment, Increase Customers, Increase Proposed Processes and Complete Organizational Performance Satisfaction, Communication and Collaboration, Capacity Building, Cost Reduction in Outsourcing Process, Effectiveness of Human Resources, Quality of Contractors and Increasing Customer Satisfaction.	Outsourcing performance
The scope of outsourcing pattern selection	Yang et al. (2007); Asadi et al. (1986)	Quality of Service, Management Systems, Customer Management, Information Security, Geo-subsystems, Flexibility and Problem Solving, Management Control, Focus on Key Features, Alignment with Corporate Strategy, Information Security, Strategic Dependency, Cost Reduction, Quality Service, Flexibility, Speed, Internal Operation, Complete Outsourcing and Joint Ventures, Cost, Quality, Service, Relationship Type and Organizational Structure for Supplier Evaluation, Cost Saving, Focus on Core Competencies, Flexibility, Information Security, Lack of Management Control, Labor Unions, Ethical Issues, and Provider Serviceability, Cost Metrics Including (Unit Price, Shipping Cost and Warranty Costs), Relationships Included (Years of Contact, Attitude, Trust), Agility (Ability to Respond to Demand Changes both in Volume and Design), Avoidance of Delay in Delivery and Quality (Product and Service).	Outsourcing pattern
Areas of effective factors on outsourcing	Embleton (1998); Hassanain and Al-Saadi (2005); Khalili et al. (2014); Shafie Nikabadi and Hoseini (2019)	Statement of Mission, Culture, Trade Union Environment, Future Workforce Needs, Current Workforce Skills, Current Competencies and Structure and Purpose of the Organization, Attracting Qualified Contractors, Having Expert Knowledge by Contractor, Outsourcing Based Cost Listing, Implementation of the Logical Outsourcing Process, Providing Financial Opportunities, Evaluating and Supervising the Outsourced Services, Flexibility of the Contractor Company (Having Several Sources for Uncertainty Preparedness), Contractor Innovation (Access to Work) Specific or Specialized Technology), Improvement of Project Execution Time, Improvement of Project Execution Quality, Standards' Dedication of Tasks, Precise Job Definition, Proper Job Referral, Accurate Supervision and Delivery, Clarity and Transparency of Contracts, Employer's Knowledge and Experience in Outsourcing and Forecasting Specific Cases, Specifying Boundaries of Duties and Responsibilities, Criteria Strategic, Incentives, Communications, Competitive Markets, Supplier Independence.	Outsourcing success

Table 2 Profile of interviewees

Socio-demographic characteristics and professional category	Answer	Percentage (size)
Age	31 to 40 years	28% (14)
	41 to 50 years	56% (28)
	Older than 51 years	14% (7)
	No answer	2% (1)
Work experience	Less than 10 years	6% (3)
	Between 11 to 20 years	46% (23)
	More than 21 years	48% (24)
Category	Client	22% (11)
	Consultant	34% (17)
	Contractor	44% (22)
Position	Manager	16% (8)
	Financial manager	10% (5)
	Technical advisor	30% (15)
	Executive	44% (22)

Table 3 Survey statements

No.	Factors	Sources	Factors influencing capacity of outsourcing suppliers
1	JUDICIAL-LEGAL	Hassanain and Al-Saadi (2005); Sharda et al. (2011); Asadi et al. (2018)	Determining external supplier obligations to pay damages to employer and third party facilities and employees.
2		Hassanain and Al-Saadi (2005); Arroyo-López et al. (2012); Derakhshonpour et al. (2018)	Clarification of issues related to termination/ending and the effects and actions after each with regard to the existence of a decision-making power for the external supplier.
3		UmaDevi et al. (2012); Khalili et al. (2014); Derakhshonpour et al. (2018)	Determine the necessity (whether or not) of how the client intervenes with regard to the sensitivity of the type of service outsourced.
4		Sharda et al. (2011); Arroyo-López et al. (2012); Asadi et al. (2018)	Review whether or not there is any adjustment to the terms and conditions of the contract.
5		Arroyo-López et al. (2012); Lee et al. (2018)	Clarify all insurance obligations of the parties, in the terms of the contract.
6		Sharda et al. (2011); UmaDevi et al. (2012); Khalili et al. (2014); Lee et al. (2018)	Determining the task and clarity of how maintenance services for office and residential buildings are securely provided to the outside supplier and its agents during the term of the contract.
7		Embleton and Wright (1998); Asadi et al. (2018); Lee et al. (2018)	Preparation of regulatory and legal solutions for outsourcing decision making.
8		Embleton and Wright (1998); Arroyo-López et al. (2012); UmaDevi et al. (2012)	Assign responsibility for recruitment or discharge to external supplier.
9	CONTRACT	UmaDevi et al. (2012); Lee et al. (2018)	Identifying the nature of outsourcing contracts.
10		Hassanain and Al-Saadi (2005); Khalili et al. (2014); Lee et al. (2018)	Providing transparency of contract formation.
11		UmaDevi et al. (2012); Asadi et al. (2018); Derakhshonpour et al. (2018)	Specifying the type of agreement (contract) suspended, frozen, permissible and necessary.
12		Interview with experts	Providing exact definition of swap.
13		Hassanain and Al-Saadi (2005); Arroyo-López et al. (2012); Asadi et al. (2018)	Determining the formation of a contract as activity-based or product-oriented.
14		Interview with experts	Identifying the risks associated with the contract.
15		UmaDevi et al. (2012); Lee et al. (2018)	Clarification of the dispute settlement reference authority.
16		Arroyo-López et al. (2012); Khalili et al. (2014)	Specifying the items that are related to the Hardship theme.
17		Hassanain and Al-Saadi (2005); Khalili et al. (2014); Lee et al. (2018)	Since in the outsourcing referral process, the external supplier must prove that the bidding service performs more efficiently and effectively than the existing conditions, the bidding related to outsourcing is required to be held in the two-stage bidding process.
18		Sharda et al. (2011); Khalili et al. (2014); Derakhshonpour et al. (2018)	Developing the characteristics of outsourcing service providers with respect to expected services as well as country laws and regulations.

19	MANAGEMENT	Embleton and Wright (1998); UmaDevi et al. (2012); Asadi et al. (2018)	Detailed formulation of public technical specifications and private technical specifications in supplier contracts.
20		Sharda et al. (2011); Khalili et al. (2014); Lee et al. (2018)	Accurate definition of the unit cost list of work done in contracts.
21		Hassanain and Al-Saadi (2005); Arroyo-López et al. (2012)	Providing and defining precisely the scope of projects in outsourcing.
22		UmaDevi et al. (2012); Khalili et al. (2014); Derakhshonpour et al. (2018)	Specifying standards and performance indicators for outsourcing activities.
23		Interview with experts	Understanding laws and regulations related to the subject of the contract in the outsourcing process.
24		Hassanain and Al-Saadi (2005); Arroyo-López et al. (2012);	Identifying and evaluating the problems of outsourced activities before, during and after outsourcing.
25		Hassanain and Al-Saadi (2005); Sharda et al. (2011); Lee et al. (2018)	The outsourcing of the expected product and services should be clear and depending on the type of contract being formulated as activity-based or product-based, all activities or end-products will be described in terms of material, description and quantity.
26		UmaDevi et al. (2012); Khalili et al. (2014); Asadi et al. (2018)	Managing the risk sharing between the employer and the external supplier.
27		Embleton and Wright (1998); Derakhshonpour et al. (2018)	Assessing the risks according to the type of task and manage the risk sharing identified.
28		Yang et al. (2007); Sharda et al. (2011); Khalili et al. (2014)	Clarifying how the private sector (external supplier) interacts during the duration of the contract with public authorities, such as the municipality, the governorate and other relevant organizations.
29		Hassanain and Al-Saadi (2005); Arroyo-López et al. (2012)	Clarifying how the client oversees the performance of the contract subject services.
30		Interview with experts	Clarifying how outsourced reporting is required by the client, including the types of reports requested and the timing of submissions.
31		Embleton and Wright (1998); Yang et al. (2007); Khalili et al. (2014)	Specifying decision making in terms of production factors, processes, management, and strategies.
32		Hassanain and Al-Saadi (2005); Arroyo-López et al. (2012)	Providing cost and performance analysis based on client requirements for outsourcing.
33		Yang et al. (2007); UmaDevi et al. (2012); Lee et al. (2018)	Determining the human resource assignment in outsourced projects according to the assignments set forth in the government development plan rules related to outsourcing to private and public companies and institutions.
34		Embleton and Wright (1998); Hassanain and Al-Saadi (2005); Lee et al. (2018)	Identifying assignable processes and determining key activities.
35		Arroyo-López et al. (2012); Khalili et al. (2014)	Careful consideration of the application of international standards in this field.
36		Interview with experts	Investigating market dynamics.
37		Sharda et al. (2011); Khalili et al. (2014); Derakhshonpour et al. (2018)	Preparing the document of the outsourcing process.

38		Embleton and Wright (1998); UmaDevi et al. (2012); Asadi et al. (2018)	Existence of scientific and expert advisors to guide the personnel involved in outsourcing projects.
39		Interview with experts	Conducting training for the personnel involved in outsourcing projects.
40		Hassanain and Al-Saadi (2005); UmaDevi et al. (2012); Derakhshonpour et al. (2018)	Paying attention to the expertise in recruiting and selecting human resources for outsourcing projects.
41		UmaDevi et al. (2012); Asadi et al. (2018); Lee et al. (2018)	Identifying the long-term and short-term goals of outsourcing projects.
42		Hassanain and Al-Saadi (2005); Yang et al. (2007); UmaDevi et al. (2012)	Developing appropriate strategies for outsourcing projects.
43		Interview with experts	Existence of clear and transparent procedures for outsourcing activities.
44	**FINANCIAL**	Embleton and Wright (1998); Arroyo-López et al. (2012)	Reviewing and specifying legal deductions related to contracts.
45		Yang et al. (2007); Sharda et al. (2011); Derakhshonpour et al. (2018)	Accurate estimation of the transaction amount and its bases with respect to professional estimation approaches from the perspective of the employer and the contractor.
46		Embleton and Wright (1998); Yang et al. (2007); Khalili et al. (2014); UmaDevi et al. (2012)	Appropriate method for calculating the potential damages to the client's facility caused by the external supplier.
47		Hassanain and Al-Saadi (2005); Sharda et al. (2011); Asadi et al. (2018)	Procedural unity and transparency in whether or not to pay a prepayment on contracts.
48		Lee et al. (2018)	Terms and conditions and payment of external supplier monthly invoices.
49		Embleton and Wright (1998); Sharda et al. (2011); Arroyo-López et al. (2012)	Developing pricing model according to the assignments in the notes related to the laws and requirements of government development plans in different periods.
50		Yang et al. (2007); Sharda et al. (2011); Khalili et al. (2014); Lee et al. (2018)	Careful preparation of the estimated amount of the transaction and its bases with respect to the assignments set out in the notes to the rules of the government's development plans at various times.

Table 4 Results of measurement model

Variable	**Reliability of measures**		**Convergent validity**	**Discriminant validity**			
	Cronbach's Alpha	*CR*	*AVE*	*Fornell-Larcker criterion*			
				J-L	C	F	M
Judicial-legal (J-L)	0.766	0.763	0.577	0.526			
Contract (C)	0.839	0.873	0.612	0.507	0.642		
Financial (F)	0.868	0.898	0.559	0.449	0.579	0.747	
Management (M)	0.946	0.952	0.568	0.495	0.596	0.664	0.684

Table 5 Quality criteria of structural model

Variable	R^2	Q^2	f^2
Judicial-legal	0.479	0.082	0.920
Contract	0.762	0.233	0.600
Financial	0.785	0.373	0.917
Management	0.940	0.389	0.590

Table 6 Results of Kolmogorov-Smirnov test

Variables of the research	Significance level	Error value	Confirmation of the premise	Normal distribution
Outsourcing to build supplier capacity	0.178	0.05	H_0	included

Table 7 Results of single-sample t-test for factors influencing outsourcing development for supplier capacity building

Variable	Upper limit	Lower limit	Test Value = 3			Standard deviation	Mean
			p-value	*df*	*t*		
Judicial-legal	1.143	0.856	0.000	49	14.01	0.504	4.0
Contract	1.284	0.778	0.000	49	8.19	0.889	4.0
Financial	1.102	0.749	0.000	49	10.54	0.621	3.9
Management	1.306	0.931	0.000	49	12.00	0.659	4.1

Table 8 Results of Friedman test (significant result)

K^2	Degree of freedom	Significance level	Test result
3.788	3	0.000	H_0 rejected

Table 9 Results of Friedman test (average rating of outsourcing development components for suppliers' capacity building)

No.	Group of items	Ranking average	Rank
1	Judicial-legal	2.49	2
2	Contract	2.43	3
3	Financial	2.30	4
4	Management	2.78	1