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PhD Thesis

The Influence of Public Service  
Motivation on Ethical  
Behaviour and Organizational  
Performance in Public  
Administration Sector:  
Evidence from the Hashemite  
Kingdom of Jordan

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TESE DE DOUTORAMENTO

THE INFLUENCE OF PUBLIC  
SERVICE MOTIVATION ON ETHICAL  
BEHAVIOUR AND  
ORGANIZATIONAL PERFORMANCE  
IN PUBLIC ADMINISTRATION  
SECTOR: EVIDENCE FROM THE  
HASHEMITE KINGDOM OF JORDAN

Yazan Taher A.A Shawabkeh

**ESCOLA DE DOUTORAMENTO  
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Título da tese: **The Influence of Public Service Motivation on Ethical Behaviour and Organizational Performance in Public Administration Sector: Evidence from the Hashemite Kingdom of Jordan**

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## ABSTRACT

The aim of this dissertation was to investigate the influence of Public Service Motivation (PSM) on Ethical behavior and Organizational Performance in Jordanian public hospitals. This dissertation had been divided into two folds that filled numerous flagrant gaps in the arena of PSM. In the first fold, we investigated the influence of PSM on Ethical Behavior using three-level models via Structural Equation Modeling (SEM). In the second fold, we contribute to the methodological linking between PSM and Organizational Performance using econometric techniques instead of a survey-based method, via two-stage Data Envelopment Analysis (DEA). Our study used two types of data, namely, (i) primary and (ii) secondary data. Our primary data has been collected using a questionnaire that had been developed based on the previous scales. Our tests for scale validity and reliability showed a very strong fitting for the theoretical dimensionality of the variables. On the other hand, our secondary data had been retrieved from annual reports of JMoH after taking their ethical approval to conduct our study. The time scope for this research was the triennial 2019-2021, and the population scope was the Jordanian public hospitals. The results of SEM indicated a significant and positive influence of PSM on ethical behavior. In the second fold, in the first stage of DEA, we found that the average efficiency of Jordanian public hospitals during the period (2019-21) varied from 82% to 88% between all the four adjusted DEA models. In the second stage of DEA, we used two types of models, (i) Within-Between Models and (ii) Fixed-Filtered Effect Models, in order to estimate the influence of PSM on organizational performance. We found that, if performance is identified with our measure of productive efficiency, the PSM influence on organizational performance appears as dubious and more negative than positive — something that might suggest a trade-off between our DEA-based measure and other performance dimensions. This research's contributions include the definition of meaningful problems; filling numerous flagrant gaps; collection of more responsive data; scales development; contributing to the theory of PSM by addressing the knowledge gap regarding the relationship between PSM, ethical behavior, and organizational performance; conducting these types of studies in non-Western contexts like Jordan, especially in the public health sector. Our study suggests that administrators of public hospitals should be mindful of the PSM levels of healthcare workers. Besides acknowledging the importance of cultivating PSM and how it influences many important organizational outcomes.

**Keywords:** Public Service Motivation, Ethical Behaviour, DEA, SEM, Jordan.



## **EXPANDED SUMMERY**

This dissertation aimed to study the influence of PSM on ethical behaviour and organizational performance in the Jordanian public hospitals that work under the supervision of the ministry of health in the Hashemite Kingdom of Jordan (HKJ). After the deep scientific review that has been done, it revealed a number of flagrant research and knowledge gaps that require bridging, which defined the problem of the current study and established its framework to fill a number of these gaps. However, this study had been split into two folds. In the first fold, we investigated several gaps related to the relationship between PSM and ethical behaviour. One of the most important gaps that have been studied, is the lack of empirical evidence on the relationship between PSM and ethical behaviour, which remains scarce.

More specifically, this study sheds light on further knowledge gaps in this field of research, namely: (i) the lack of empirical studies in many countries, since most of the related published literature are Western observational studies; (ii) disagreement among researchers on the dimensions of ethical behaviour; (iii) the multitude of PSM and ethical behaviour instruments or indices and lack of a standard index; (iv) the limited number of the world countries that have been addressed until now by this type of research; and, in harmony with the last point, (v) the validity of the relationship between PSM and EB has rarely been tested in non-Western environments, with almost no research examining PSM and its influence on ethical behaviour in Arab public organizations; and, finally, (vi) the absence of any previous local or global study that examined the relationships of all aspects of PSM individually with all dimensions of ethical behaviour respectively.

The second fold of the study is relating to the influence of PSM on organizational performance. For the past two decades, public sector developments aimed to increase organizational performance by implementing managerial tools and methods (Ritz, 2009). The foremost problem in this part is the fact that the public sector reforms mainly focus on managerial tools rather than focusing on attitudinal constructs such as PSM. However, proactive scholars such as Perry and Wise (1990), argued not only that public sector workers have a greater and stronger public service ethic than private-sector workers, but that government can utilize that ethic to improve its performance and productivity (Alonso & Lewis, 2001).

Numerous scholars had studied the influence and relationship between PSM and organizational performance (e.g., Lee, 2005; Kim, (2004, 2016); Ritz, 2009; Miao et al., 2019; Zhu & Wu, 2016; Park, 2013; Mostafa & Leon-Cazares, 2016; Park & Lee, 2020; Palma, Crisci & Mangia, 2020). Hence, many researchers had emphasized the relatively positive relationship between both variables (e.g., Lee, 2005; Kim, (2004, 2016)). It has been argued by Austen and Zacny (2015) that PSM affects the public organizations' worker's performance and organizational effectiveness. Specifically regarding the relationship between PSM and health organizational performance, Belrhiti et al. (2020) highlighted that it is receiving an exponentially increasing attention among decision-makers, researchers, scholars, and international health organizations.

In reviewing this literature, Meier and O'Toole (2013a) strongly advised not to use ordinary methods such as survey-based methods to measure organizational performance due to the CMB. They studied the performance as a dependent variable of public schools workers by comparing two different models using external measurements of performance. In light of their findings, they highly suggested not to use survey-based methods and that they view critically any existing studies with this type of measurement. Within the same context, earlier, Andersen and Serritzlew (2012) used archival data for a measure that could lead to heightened performance as a step in the right direction. However, the mechanisms underlying the relationship between PSM, and public sector organizational performance remain as they called it a

“black box” (Andrews & Boyne, 2010; Mostafa & Leon-Cazares, 2016). Our study addressed this gap by investigating the influence of PSM on organizational performance defined by efficiency using two-stage DEA.

We used two types of data in this study. First, we used original data collected from a questionnaire that we build for the purposes of this study. The self-reported questionnaire has been delivered through the field distribution by the researcher to the hospitals’ workers from all organizational levels and job titles (i.e., officials, doctors, nurses, managers, etc.). The researcher at the time of data collection tried to distribute a portion of the questionnaires through internal e-mail to the hospitals that are far away from the capital Amman, after taking permission to access their employees. This e-mail consisted of a brief description of the aim of the study and information related to data collection, and it clarified data confidentiality and use only for the purposes of pure scientific research. However, almost all the hospitals refused to collect the data using online forums, which put the necessity to travel to Jordan and collect the data from each hospital. Questionnaires were distributed using a simple random sampling technique, where the universe included all public workers in the Jordanian public hospitals. The minimum calculated sample size was almost 380 (379) but, however, we distributed 1000 questionnaires and we received 791 responses with a 79% response rate. Next, after excluding invalid questionnaires, we kept only 567 valid responses. On the other hand, we used secondary data from the JMoH for the input and output indicators.

Knowing that the components of PSM in association with ethical behaviour in the Arabic countries and especially the Jordanian public sector context have not been researched previously, the first part of this dissertation aimed to investigate the influence of PSM with its studied dimensions [Attraction to Public Service (APS), Self-Sacrifice (SS), Compassion (COM), Commitment to Public Values (CPV)] on Jordanian hospital’s ethical behaviour with its studied dimensions [Ethical Behaviour of Self (EBS), Ethical Behaviour of Co-workers (EBC), Ethical Leadership (ELS)]. In order to achieve this aim, we built our tool based on pre-established and pre-validated measures of PSM

(Kim et al., 2013), as well as on Deshpande, Joseph & Prasad (2006) and Yuklet et al. (2013) for measuring ethical behaviour. We modified the original constructs to adopt the nature of Jordanian culture, which made us took a later step, by developing a study tool for each of the studied variables and developing them in line with the reality of the state of public hospitals in Jordan; as a gateway and a preliminary step for future researchers who want to study these variables in similar organizations in Jordan or the Arab world.

Given the fact that most of the literature on PSM is focused on enhancing the scale and developing it, that will be a road map for future researchers. Our Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) results showed that what is obtained from our empirical study fit the theoretical dimensions of PSM and ethical behaviour. Additionally, we drop the variable COM from our study. This shed the light on a methodological question concerning the originality of COM as a dimension or facet of PSM as a single formative scale/construct. Although this issue had been raised recently by several researchers (i.e., Coursey, et al., 2011; Vandenabeele, 2008; Esteve, et al., 2016), this study adds empirical evidence to re-evaluate the necessity of adding COM into the construct of PSM.

After developing our tool for the first part of the dissertation, we estimated three main models via Structural Equation Modelling (SEM). In order to test the study hypothesis, the estimated three models were formed as three levels. Firstly, the Level One SEM model, which regarded the influence of PSM on ethical behaviour. Secondly, the Level Two SEM model, which tested the influence of PSM dimensions on ethical behaviour. Thirdly, the Level Three SEM model, which tested the influence of PSM dimensions on the ethical behaviour dimensions.

All the SEM models had positive beta coefficients and were found to be statistically significant (joint Sig < 0.05). In the first model, PSM as a whole positively influences the ethical behaviour of Jordanian public hospitals' employees ( $R^2=0.35$ ,  $\beta=0.60$ , Sig=0.00) and it alone explains 35.72% of the variances in the ethical behaviour of those employees. If PSM level increases by one standard deviation, ethical behaviour increases by 0.5977, being 0.5625 the value of the estimated unstandardized regression coefficient with a standard error of 0.03. In

the second model (i.e., Level Two SEM model), each of the PSM dimensions unless APS affect EB in a statistically significant way, and they collectively explain a 44.75% of ethical behaviour. In the case of an increase in the APS by one standard deviation, ethical behaviour will increase by 0.0537 standard deviations, explaining a 0.22% of ethical behaviour in it. SS increased by one standard deviation, the hospital employees' ethical behaviour will increase by 0.0897 from the standard deviation, explaining a 0.086% of ethical behaviour. If the CPV increases by one standard deviation, ethical behaviour will increase by 0.5928 standard deviations, explaining a 43.67% of ethical behaviour.

In the third SEM model, the results indicate that each of the PSM dimensions unless APS affect Ethical Behaviour of Self in a statistically significant way and they, combined, explain a 54.59% of EBS. In case APS increases by one standard deviation, EBS will be increased 0.0463 from the standard deviation, explaining a 0.16% of EBS. In the case of SS, if it increased by one standard deviation, EBS will be increased by 0.1052 from the standard deviation, explaining a 1.06% from EBS. In case CPV increased with one standard deviation, so EBS will be increased by 0.6557 from the standard deviation, explaining a 53.36% of the employee's EBS dimension. Moreover, PSM with its dimensions explained a 17.00% of Ethical Behaviour of Co-workers, albeit only CPV significantly affects it. In case of APS, if it increased with one standard deviation, EBC will be regressed by 0.0848 from standard deviation, to explain a 0.098% from EBC. Similarly, in the case of SS increased with one standard deviation, EBC will be regressed by 0.0475 from the standard deviation, to explain a 0.11% of the EBC. And in case of CPV increased with one standard deviation, EBC will be regressed by 0.4464 from the standard deviation, to explain a 15.72% of EBC.

Lastly, PSM dimensions explain an 18.65% of Ethical Leadership and all of them were found as statistically significant. In case APS increased by one standard deviation, ELS will be regressed 0.1812 from the standard deviation, to explain a 5.13% from ELS. Correspondingly, in the case of SS increased with one standard deviation, ELS will be regressed by 0.1408 from the standard deviation, to explain a 0.98% of the ELS. And in case of CPV increased with one standard deviation,



ethical leadership will be regressed by 0.2280 from the standard deviation, to explain a 12.53% of ELS.

On the second fold of this dissertation, we applied a two-stage DEA model to measure and explain organisational performance, defined by productive efficiency in the MoH hospitals. We used reported published data from MoH after taking the permission to use this data. With this aim in mind, in this dissertation, we present a new empirical framework for analysing the performance by using the aggregated survey data of PSM combined with a set of inputs and outputs from published reports, instead of using survey-based tools to measure organizational performance. In order to achieve the aims of the second part of the dissertation, we used panel data from three years (2019-21) to obtain DEA-based efficiency scores and estimate econometric models that explain them.

To perform the second-stage DEA, we dealt with the limitations arising from the relatively low number of public hospitals existing in Jordan and the strictly cross-sectional nature of our PSM data. On the plausible assumption that these data could be extrapolated to the year before and the year after their collection, a way was paved to triplicate the observations by exploiting the same three-year window that had been already used in the first stage of our DEA. This supposed, however, to consider PSM as a time-invariant variable and prevented its entering into fixed-effects models. This consideration is supported by the fact that PSM is considered a stable property (like a trait), and it only changes slowly after time, and after intense experiences, with attribution to the attraction–selection mechanism (Brænder & Anderson, 2013; Kjeldsen, 2014; Wright & Christensen, 2021). In order to overcome this obstacle, we resorted to using two different kinds of models: the so-called hybrid or Within-Between (WB) models and the Fixed-Effects Filtered (FEF) models.

Primarily, we estimated organizational performance defined by efficiency scores in the first stage of DEA using MaxDEA 8 Ultra software. We calculated the efficiency scores using Multiplier Model and the Window width was 3 (2019-21). At the beginning, we estimated both (1) input and output oriented CRS models and (2) input and output oriented VRS models, albeit we finally focused on the latter. Our panel

data consisted of three years, and our DMUs were 27 units, with a total of 81 observations. In the first set of WB models (i.e., those with PSM as an explanatory variable), results indicated a substantially higher joint significance ( $p$ -values  $< 0.05$  for the F statistic) of the models for input-oriented efficiency. These models explain around a quarter of the total variance in efficiency scores. In all the four models, however, PSM exhibits negative beta coefficients. Despite its lack of statistical significance, this result invites us to consider the possible trade-offs between our limited measure of productive efficiency and other performance dimensions that may be relevant from a PSM perspective.

In the second set of WB models (i.e., those with each PSM dimension as an explanatory variable for input efficiency), we found that PSM dimensions only appear as significant in the first model (i.e., that with simultaneous inclusion of all the PSM dimensions), in which only SS has a positive beta coefficient, while the rest of dimensions show negative coefficients. In the third set of WB models (i.e., those which each PSM dimension as an explanatory variable for output efficiency), results showed that only APS and SS from PSM dimensions were found to be statistically significant in the first model (i.e., that with simultaneous inclusion of all the PSM dimensions). On the other hand, in the other three models of the same set, only APS was found to be statistically significant. Regarding the signs of the slope parameters, they are negative for all the dimensions unless the positive coefficient for SS is in the first model.

In the FEF models with input efficiency as a dependent variable, in the first stage, our time-varying variables are entered as regressors into a fixed-effects model. The model fits reasonably well ( $R^2 = 0.88$ ), and it shows a high joint significance ( $p$ -value  $< 0.00000$  for the F statistic). However, the individual significance tests only allow rejecting the null hypothesis for the variables REFP, TIME and COVID19. Public service motivation and its dimensions exhibit, however, negative beta coefficients unless in the case of CPV, which has the coefficient closest to zero. Thus, our FEF-model results for public service motivation and its two first dimensions led us, again, to consider the possible trade-offs between input efficiency and other performance criteria more linked to PSM.

Lastly, the second FEF model with output efficiency as a dependent variable shows, in its first step, a fit relatively higher than the input efficiency as a dependent variable ( $R^2 = 0.95$ ). In the second step, PSM and its dimensions did not seem to have any influence on output efficiency at the conventional significance levels. Moreover, they demonstrate negative beta coefficients, unless in the case of CPV, which has the coefficient closest to zero as in the FEF model with input efficiency. Accordingly, our FEF-model results for PSM and its two first dimensions led us, again, to consider the possible trade-offs between output efficiency and other performance criteria more linked to PSM.

### **Main contributions of this research**

Based on what has been discussed, this thesis contributes to the understanding of the relationship between PSM, ethical behaviour, and organizational performance empirically and theoretically in the public administration, organizational behaviour, and economics literatures, from different perspectives.

Our study underscores the importance of the influence of PSM on ethical behaviour. First, despite the very few studies that investigate the direct relationship (e.g., Lim Choi, 2004; Houston, 2006; Kwon, 2014; Maesschalck et al., 2008; Moynihan, 2010; Wright et al., 2016; Meyer-Sahling, et al., 2019), our study is still one of the preliminary studies that perform this kind of research and contribute to expose this relationship. Also, while prior researchers on these two variables ignore the interrelationships between their respective dimensions, one of the key contributions of this study is that extends its focus to such dimensions.

Mostly, the PSM prior work and its theory have been applied in developed countries in western cultural and structural sittings. Since the expansion of PSM literature, very little research has been done so far in a non-western context, especially in Arab cultural environments (e.g., Belrhiti, et al., 2019; Hassan & Ahmad, 2021). For this, we hope that our study to be the starting point in Jordan and the neighbouring countries to contribute to the theory of PSM.

This study also has a methodological contribution, concerning how we studied the relationship between PSM and organizational performance. To investigate the influence of the former on the latter, we resorted on two-stage DEA, using questionnaire data to measure PSM and then regressed the DEA-1st stage efficiency scores on that PSM measure. This contribution is concerned with two disciplines, being placed at the crossroads where public administration meets economics. This might open a new door to the literature of PSM for new possibilities and multidisciplinary approaches.

Our idea is based on the claim that traditional methods that capture organizational performance are characterized by a lot of disadvantages, which put the need to develop and adopt new evaluation methods. From this point came our contribution by using DEA, which helps to overcome many weaknesses and represents a relatively assumption-free tool to evaluate organizations' performance via efficiency scores. Furthermore, despite the huge body of literature concerning measuring the performance of the healthcare sector using the DEA, still, there is a scarcity of empirical academic production in developing countries, which could be due to the unavailability of data (Sultan & Crispim, 2018). Particularly, in Arabic countries, four studies were conducted in the public health sector, only one of them in Jordan. Aimed at Jordan, until now, no study has studied the organizational performance in the country using two stage-DEA.

Additionally, our study introduces a very important and interesting methodological contribution regarding the constructs of PSM and ethical behaviour, since we developed a tool with very robust indices for the Jordanian public health sector reality. Given the fact that most of the literature on PSM is focused on enhancing the scale and developing it, that will be a road map for future researchers. Our EFA and CFA showed that the results obtained from our empirical study fit the theoretical dimensions of PSM and ethical behaviour. Also, our study shed the light on a methodological question concerning the originality of COM as a dimension of PSM as a single formative scale/construct. Although this issue had been raised recently by several researchers (i.e., Coursey, et al., 2011; Vandenabeele, 2008; Esteve, et

al., 2016), this study adds empirical evidence to re-evaluate the necessity of adding COM into the construct of PSM.

According to our limited knowledge, our study is the first one that combined these variables together and analyses them in Jordan or in the public health sector in Jordan. This fills one of the most important gaps from prior research since most of this is only focusing on the developed countries. In addition, our study embraces the whole spectrum of employees in the Jordanian public hospitals, whereas, on contrary, most of the previous research on PSM focuses mostly on one stratum (e.g., leaders, executive workers, students, etc.).

To sum up, our study success to fill the gaps that have been presented in the body of the research problem. It discovers the relationship between PSM and ethical behaviour as well as the relationships between their dimensions. It also investigates the relationship between PSM and organizational performance using a different technique from self-reported performance measurements in public organizations. It additionally deals with the multitude of PSM and ethical behaviour instruments or indices and lack of a standard index, and it tests the validity of the relationship between the studied variables in non-Western environments.

### **Study Limitations**

While our findings offer insights into the relationship between PSM, ethical behaviour and organizational performance in the Jordanian public sector, this study is –like any other– subjected to several empirical limitations.

Firstly, the first part of our research is based on a cross-sectional design, which means that we are hardly able to infer and capture strict causality between PSM, ethical behaviour and organizational performance. Even though causality has been reasoned and based on theories, logical rationality, and logical interpretations, it has been sustained that the only strict way to assess it –the causality– is by conducting experimental designs over a long period of time. Second, our study has been conducted in one country and in a specific sector (i.e., Health Sector), so this opens the debate on the generalizability of the results, where it should be with caution.

Thirdly, the constructs of PSM and ethical behaviour were self-reported scales, which could jeopardise the data due to social desirability and CMV. We used many techniques to address these issues, by including the Over-claiming Scale within the constructs of PSM and ethical behaviour to capture if the respondents tend to be over claimers (Ludeke & Makransky, 2016). Indeed, our results indicate that the data are free from CMV. Moreover, we assure the anonymity of the respondent's answers and personal information.

To decrease the probability to have social desirability bias, we follow the technique of Podsakoff et al. (2003), which is called the "Improving Scale Items" technique, by avoiding using vague terms or statements in each item, defining the ambiguous or difficult to understand terms for the respondents, and finally avoiding the double-barrelled questions. Also, we explained to the respondents that this questionnaire is only for academic purposes, and their data will lock and kept confidential.

Fourthly, it's the geographical limitation. Hospitals are spread all over the kingdom very far apart, and the Ministry of Health did not agree to distribute the questionnaire electronically, due to the lack of a unified and complete database for all hospitals. This forced the researcher to travel to Jordan and tour all over the country to collect data and conduct interviews with the hospital managers. This cast a heavy burden on the researcher but, in the end, the work was successful.

Lastly, one of the limitations of this thesis is that in the second part of it, to test the influence of PSM on organizational performance, we had to combine multiple-year DEA efficiency scores, estimated from a secondary data provided by the JMoH, with our cross-sectional data for PSM. To do it, we had to assume time-invariance in PSM during the selected triennium (2019-21), justifying this assumption from original papers by several prominent PSM schoolers who found that PSM has a stable nature and needs a long time to be changed (Wright & Grant, 2010; Brænder & Anderson, 2013; Kjeldsen, 2014; Vogel & Kroll, 2016; Wright & Christensen, 2021).

Despite these limitations, our study provides a preliminary link between PSM, ethical behaviour and organizational performance, being

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one of the novel studies within the context of Arabic countries and middle-eastern literature.

## RESUMEN AMPLIADO

Esta Tesis tuvo por objeto estudiar la influencia de la motivación del servicio público (PSM, ya que emplearemos con carácter general las siglas en inglés) en el comportamiento ético y el rendimiento organizativo en los hospitales públicos jordanos que operan bajo la supervisión del Ministerio de Sanidad del Reino Hachemita de Jordania (HKJ). Tras la profunda revisión científica que se ha realizado, se han puesto de manifiesto una serie de flagrantes lagunas de investigación y conocimiento que es necesario subsanar, lo que ha definido el problema del presente estudio y ha establecido su marco para colmar una serie de estas lagunas. Sin embargo, este estudio se ha dividido en dos partes. En la primera parte, investigamos varias lagunas relacionadas con la relación entre la PSM y el comportamiento ético. Una de las lagunas más importantes que se han estudiado es la falta de pruebas empíricas sobre la relación entre la PSM y el comportamiento ético, que sigue siendo escasa.

Más concretamente, este estudio arroja luz sobre diversas lagunas de conocimiento en este campo de investigación, a saber: (i) la falta de estudios empíricos en muchos países, ya que la mayor parte de la literatura publicada al respecto son estudios observacionales occidentales; (ii) el desacuerdo entre los investigadores sobre las dimensiones del comportamiento ético; (iii) la multitud de instrumentos o índices de PSM y comportamiento ético y la falta de un índice estándar; (iv) el número limitado de países del mundo que han sido abordados hasta ahora por este tipo de investigación; y, en consonancia con el último punto, (v) la validez de la relación entre la PSM y el



comportamiento ético (EB) rara vez se ha puesto a prueba en entornos no occidentales, con casi ninguna investigación que examine la PSM y su influencia en el comportamiento ético en las organizaciones públicas árabes; y, por último, (vi) la ausencia de cualquier estudio local o mundial anterior que examine las relaciones de todos los aspectos de la PSM individualmente con todas las dimensiones del comportamiento ético respectivamente.

La segunda parte del estudio está relacionada con la influencia de la PSM en el rendimiento organizativo. Durante las dos últimas décadas, las reformas del sector público han tenido como objetivo aumentar el rendimiento organizativo mediante la aplicación de herramientas y métodos de gestión (Ritz, 2009). El principal problema en esta parte es el hecho de que las reformas del sector público se centran principalmente en las herramientas de gestión en lugar de centrarse en constructos actitudinales como la PSM. Sin embargo, estudiosos proactivos como Perry y Wise (1990), argumentaron no sólo que los trabajadores del sector público tienen una mayor y más fuerte ética de servicio público que los trabajadores del sector privado, sino que el gobierno puede utilizar esa ética para mejorar su rendimiento y productividad (Alonso & Lewis, 2001).

Numerosos especialistas han estudiado la influencia y la relación entre la PSM y el rendimiento organizativo (por ejemplo, Lee, 2005; Kim, (2004, 2016); Ritz, 2009; Miao et al., 2019; Zhu & Wu, 2016; Park, 2013; Mostafa & Leon-Cazares, 2016; Park & Lee, 2020; Palma, Crisci & Mangia, 2020). De ahí que muchos investigadores hayan destacado la relación relativamente positiva entre ambas variables (por ejemplo, Lee, 2005; Kim, (2004, 2016)). Austen y Zacny (2015) han argumentado que la PSM afecta al rendimiento de los trabajadores de las organizaciones públicas y a la eficacia organizativa. En lo que respecta específicamente a la relación entre la PSM y el rendimiento de las organizaciones sanitarias, Belrhiti et al. (2020) destacaron que está recibiendo una atención exponencialmente creciente entre los responsables de la toma de decisiones, los investigadores, los académicos y las organizaciones sanitarias internacionales.

Al revisar esta literatura, Meier y O'Toole (2013a) aconsejaron encarecidamente no utilizar los métodos ordinarios, cuales los basados

en encuestas, para medir el rendimiento organizativo debido al sesgo del método común (CMB). Estudiaron como variable dependiente el rendimiento de los trabajadores de las escuelas públicas comparando dos modelos diferentes que utilizan mediciones externas del rendimiento. A la luz de sus conclusiones, sugirieron encarecidamente que no se utilizaran métodos basados en encuestas y que se considerara de forma crítica cualquier estudio existente con este tipo de medición. En el mismo contexto, anteriormente, Andersen y Serritzlew (2012) utilizaron datos de archivo para una medida que podría conducir a un mayor rendimiento como un paso en la dirección correcta. Sin embargo, los mecanismos que subyacen a la relación entre la PSM y el rendimiento organizativo del sector público siguen siendo, como ellos mismos los denominaron, una "caja negra" (Andrews & Boyne, 2010; Mostafa & Leon-Cazares, 2016). Nuestro estudio aborda esta laguna investigando la influencia de la PSM en el rendimiento organizativo definido por la eficiencia mediante el uso del DEA en dos etapas.

En este estudio utilizamos dos tipos de datos. En primer lugar, utilizamos datos originales recogidos a partir de un cuestionario que construimos para los fines del estudio. El investigador distribuyó el cuestionario autodeclarado entre los trabajadores de todos los niveles organizativos y puestos de trabajo de los hospitales (es decir, funcionarios, médicos, enfermeras, directores, etc.). En el momento de la recogida de datos, el investigador trató de distribuir una parte de los cuestionarios a través del correo electrónico interno a los hospitales que se encuentran lejos de la capital, Ammán, después de pedir permiso para acceder a sus empleados. Este correo electrónico consistía en una breve descripción del objetivo del estudio y de la información relacionada con la recogida de datos, y en él se aclaraba la confidencialidad de los datos y su uso únicamente con fines de investigación científica pura. Sin embargo, casi todos los hospitales se negaron a recoger los datos a través de esa vía, lo que hizo necesario viajar a Jordania y recoger los datos en persona en cada hospital. Los cuestionarios se distribuyeron mediante una técnica de muestreo aleatorio simple, en la que el universo incluía a todos los trabajadores de los hospitales públicos jordanos. El tamaño mínimo calculado para la muestra era de casi 380 (379) pero, sin embargo, distribuimos 1.000 cuestionarios y recibimos 791

respuestas, con una tasa de respuesta del 79%. A continuación, tras excluir los cuestionarios no válidos, nos quedan 567 respuestas válidas. Por otra parte, utilizamos datos secundarios del Ministerio de Sanidad de Jordania (JMoH) para los indicadores de input y output.

Sabiendo que los componentes de la PSM en asociación con el comportamiento ético en los países árabes, y especialmente en el contexto del sector público jordano, no se han investigado previamente, la primera parte de esta Tesis tuvo como objetivo investigar la influencia de la PSM con sus dimensiones estudiadas [Atracción hacia el Servicio Público (APS), Abnegación (SS), Compasión (COM), Compromiso con los valores públicos (CPV)] en el comportamiento ético en los hospitales jordanos con sus dimensiones estudiadas [Comportamiento ético de uno mismo (EBS), Comportamiento ético de los compañeros de trabajo (EBC), Liderazgo ético (ELS)]. Para lograr este objetivo, construimos nuestra herramienta basándonos en medidas preestablecidas y prevalidas de PSM (Kim et al., 2013), así como en Deshpande, Joseph & Prasad (2006) y Yukl et al. (2013) para medir el comportamiento ético. Modificamos los constructos originales para adaptarlos a la naturaleza de la cultura jordana, lo que nos hizo dar un paso posterior, desarrollando una herramienta de estudio para cada una de las variables consideradas y desarrollándolas de acuerdo con la realidad del estado de los hospitales públicos en Jordania; como puerta de entrada y paso previo para futuros investigadores que quieran estudiar estas variables en organizaciones similares en Jordania o en el mundo árabe.

Dado que la mayor parte de la literatura sobre la PSM se centra en mejorar la escala y desarrollarla, eso será una hoja de ruta para futuros investigadores. Los resultados de nuestro Análisis Factorial Exploratorio (EFA) y nuestro Análisis Factorial Confirmatorio (CFA) mostraron que lo obtenido en nuestro estudio empírico se ajusta a las dimensiones teóricas de la PSM y del comportamiento ético. Además, eliminamos la variable COM de nuestro estudio. Esto arrojó luz sobre una cuestión metodológica relativa a la originalidad de la COM como dimensión o faceta de la PSM como una escala/constructo formativo único. Aunque esta cuestión había sido planteada recientemente por varios investigadores (por ejemplo, Coursey, et al., 2011; Vandenabeele,

2008; Esteve, et al., 2016), este estudio añade evidencia empírica para reevaluar la necesidad de añadir la COM en el constructo de la PSM.

Después de desarrollar nuestra herramienta para la primera parte de la investigación, estimamos tres modelos principales mediante la modelización de ecuaciones estructurales (SEM). Para comprobar la hipótesis del estudio, los tres modelos estimados se formaron en tres niveles. En primer lugar, el modelo SEM de nivel uno, que consideraba la influencia de la PSM en el comportamiento ético. En segundo lugar, el modelo SEM de nivel dos, que comprobó la influencia de las dimensiones de la PSM en el comportamiento ético. En tercer lugar, el modelo SEM de nivel tres, que puso a prueba la influencia de las dimensiones de la PSM en las dimensiones del comportamiento ético.

Todos los modelos SEM tenían coeficientes beta positivos y resultaron ser estadísticamente significativos (Sig conjunta < 0,05). En el primer modelo, la PSM en su conjunto influye positivamente en el comportamiento ético de los empleados de los hospitales públicos jordanos ( $R^2 = 0,35$ ,  $\beta = 0,60$ , Sig = 0,00) y explica por sí sola el 35,72% de las variaciones del comportamiento ético de dichos empleados. Si el nivel de la PSM aumenta en una desviación estándar, el comportamiento ético aumenta en 0,5977, siendo 0,5625 el valor del coeficiente de regresión no estandarizado estimado con un error estándar de 0,03. En el segundo modelo (el modelo SEM de nivel dos), cada una de las dimensiones de la PSM salvo la APS afectan al EB de forma estadísticamente significativa, y explican colectivamente un 44,75% del comportamiento ético. En el caso de aumento de la APS en una desviación estándar, el comportamiento ético aumentará en 0,0537 desviaciones estándar, explicándose un 0,22% del comportamiento ético en él. Si el SS aumenta en una desviación estándar, el comportamiento ético de los empleados del hospital aumentará en 0,0897 de la desviación estándar, explicándose un 0,086% del comportamiento ético. Si el CPV aumenta en una desviación estándar, el comportamiento ético aumentará en 0,5928 desviaciones estándar, explicándose un 43,67% del comportamiento ético.

En el tercer modelo SEM, los resultados indican que cada una de las dimensiones de la PSM salvo la APS afectan al Comportamiento Ético de Uno Mismo de forma estadísticamente significativa y que,

combinadas, explican un 54,59% del EBS. En el caso de que la APS aumente en una desviación estándar, el EBS se incrementará en 0,0463 de la desviación estándar, explicándose un 0,16% del EBS. En el caso del SS, si aumenta una desviación estándar, el EBS se incrementará en 0,1052 de la desviación estándar, explicándose un 1,06% del EBS. En el caso del CPV, si aumenta una desviación estándar, el EBS aumentará en 0,6557 de la desviación estándar, explicándose un 53,36% de la dimensión EBS del empleado. Además, la PSM con sus dimensiones explica un 17,00% del Comportamiento Ético de los Compañeros de Trabajo, aunque sólo el CPV le afecta significativamente. En el caso de la APS, si se incrementa en una desviación estándar, el CBE se retrotraerá en 0,0848 de la desviación estándar, explicándose un 0,098% del CBE. Del mismo modo, en el caso del SS, si se incrementa en una desviación estándar, el CBE se reducirá en un 0,0475 de la desviación estándar, explicándose un 0,11% del CBE. Y en el caso de que el CPV aumente en una desviación estándar, el CBE sufrirá una regresión de 0,4464 respecto a la desviación estándar, explicándose un 15,72% del CBE.

Por último, las dimensiones de la PSM explican un 18,65% del Liderazgo Ético y todas ellas resultaron ser estadísticamente significativas. En el caso de que la APS aumente en una desviación estándar, el ELS sufrirá una regresión de 0,1812 de la desviación estándar, explicándose un 5,13% de la ELS. De la misma manera, en el caso de que el SS aumente en una desviación estándar, la ELS sufrirá una regresión de 0,1408 de la desviación estándar, explicándose un 0,98% de la ELS. Y en el caso de que el CPV aumente en una desviación estándar, el liderazgo ético sufrirá una regresión de 0,2280 de la desviación estándar, explicándose un 12,53% de la ELS.

En la segunda parte de esta disertación, aplicamos un modelo DEA bifásico para medir y explicar el rendimiento organizativo, definido por la eficiencia productiva en los hospitales del Ministerio de Sanidad. Hemos utilizado datos publicados por el Ministerio de Sanidad tras obtener el permiso para utilizarlos. Con este objetivo en mente, en esta Tesis, presentamos un nuevo marco empírico para analizar el rendimiento utilizando los datos agregados de la encuesta de la PSM combinados con un conjunto de inputs y outputs de los informes

publicados, en lugar de utilizar herramientas basadas en encuestas para medir el rendimiento organizativo. Para lograr los objetivos de la segunda parte de la Tesis, utilizamos datos de panel de tres años (2019-21) para obtener puntuaciones de eficiencia basadas en el DEA y estimar modelos econométricos que las expliquen.

Para llevar a cabo la segunda etapa del DEA, nos enfrentamos a las limitaciones derivadas del número relativamente bajo de hospitales públicos existentes en Jordania y del carácter estrictamente transversal de nuestros datos de PSM. Partiendo del supuesto plausible de que estos datos podían extrapolarse al año anterior y al año posterior a su recopilación, se buscó la manera de triplicar las observaciones explotando la misma ventana de tres años que ya se había utilizado en la primera etapa de nuestro DEA. Esto supuso, sin embargo, considerar la PSM como una variable invariante en el tiempo e impidió su introducción en los modelos de efectos fijos. Esta consideración se apoya en el hecho de que la PSM se considera una propiedad estable (como un rasgo), y sólo cambia lentamente con el tiempo, y después de experiencias intensas, con atribución al mecanismo de atracción-selección (Brænder & Anderson, 2013; Kjeldsen, 2014; Wright & Christensen, 2021). Para superar este obstáculo, recurrimos a la utilización de dos tipos de modelos diferentes: los llamados modelos híbridos o Within-Between (WB) y los modelos de filtrado de efectos fijos (FEF).

En primer lugar, estimamos el rendimiento organizativo definido por las puntuaciones de eficiencia en la primera etapa del DEA utilizando el software MaxDEA 8 Ultra. Calculamos las puntuaciones de eficiencia utilizando el modelo multiplicador y el ancho de la ventana fue de 3 (2019-21). Al principio, estimamos tanto (1) los modelos CRS orientados al input y al output como (2) los modelos VRS orientados al input y al output, aunque finalmente nos centramos en estos últimos. Nuestros datos de panel constaron de tres años, y nuestras DMUs fueron 27 unidades, con un total de 81 observaciones.

En el primer conjunto de modelos de VRS (es decir, los que tienen la PSM como variable explicativa), los resultados indicaron una significación conjunta sustancialmente mayor (valores  $p < 0,05$  para el estadístico F) de los modelos para la eficiencia orientada a los insumos.

Estos modelos explican alrededor de una cuarta parte de la variación total de las puntuaciones de eficiencia. Sin embargo, en los cuatro modelos, la PSM presenta coeficientes beta negativos. A pesar de su falta de significación estadística, este resultado nos invita a considerar los posibles trade-offs entre nuestra limitada medida de eficiencia productiva y otras dimensiones de rendimiento que pueden ser relevantes desde la perspectiva de la PSM.

En el segundo conjunto de modelos WB (es decir, los que tienen cada dimensión de la PSM como variable explicativa de la eficiencia en el input), encontramos que las dimensiones de la PSM sólo aparecen como significativas en el primer modelo (es decir, el que tiene la inclusión simultánea de todas las dimensiones de la PSM), en el que sólo el SS tiene un coeficiente beta positivo, mientras que el resto de dimensiones muestran coeficientes negativos. En el tercer conjunto de modelos WB (es decir, aquellos en los que cada dimensión del PSM es una variable explicativa de la eficiencia en el output), los resultados mostraron que, de las dimensiones de la PSM, sólo la APS y el SS resultaron estadísticamente significativos en el primer modelo (es decir, aquel con inclusión simultánea de todas las dimensiones del PSM). Por otro lado, en los otros tres modelos del mismo conjunto, sólo la APS resultó ser estadísticamente significativa. En cuanto a los signos de los parámetros de pendiente, son negativos para todas las dimensiones, salvo el coeficiente positivo del SS en el primer modelo.

En los modelos FEF con la eficiencia en el input como variable dependiente, en la primera etapa, nuestras variables temporales se introducen como regresores en un modelo de efectos fijos. El modelo se ajusta razonablemente bien ( $R^2 = 0,88$ ) y muestra una elevada significación conjunta (valor  $p < 0,00000$  para el estadístico F). Sin embargo, las pruebas de significación individuales sólo permiten rechazar la hipótesis nula para las variables REFP, TIME y COVID19. La motivación de servicio público y sus dimensiones presentan, sin embargo, coeficientes beta negativos, salvo en el caso del CPV, que tiene el coeficiente más cercano a cero. Así pues, los resultados de nuestro modelo FEF para la motivación de servicio público y sus dos primeras dimensiones nos llevaron, de nuevo, a considerar los posibles

trade-offs entre la eficiencia en el input y otros criterios de rendimiento más vinculados a la PSM.

Por último, el segundo modelo FEF con la eficiencia en el output como variable dependiente muestra, en su primer paso, un ajuste relativamente superior al de la eficiencia en el input como variable dependiente ( $R^2=0,95$ ). En el segundo paso, la PSM y sus dimensiones no parecen tener ninguna influencia en la eficiencia en el output a los niveles de significación convencionales. Además, muestran coeficientes beta negativos, salvo en el caso del CPV, que tiene el coeficiente más cercano a cero como en el modelo FEF para la eficiencia en el input. En consecuencia, los resultados de nuestro modelo FEF para la PSM y sus dos primeras dimensiones nos llevaron, de nuevo, a considerar los posibles trade-offs entre la eficiencia en el output y otros criterios de rendimiento más vinculados a la PSM.

### **Principales contribuciones de esta investigación**

A partir de lo expuesto, esta tesis contribuye a la comprensión de la relación entre la PSM, el comportamiento ético y el rendimiento organizativo de forma empírica y teórica en las literaturas de la administración pública, el comportamiento organizativo y la economía, desde diferentes perspectivas.

Nuestro estudio subraya la importancia de la influencia de la PSM en el comportamiento ético. En primer lugar, dadas las escasas contribuciones que investigan la relación directa entre ambos (por ejemplo, Lim Choi, 2004; Houston, 2006; Kwon, 2014; Maesschalck et al., 2008; Moynihan, 2010; Wright et al., 2016; Meyer-Sahling, et al., 2019), nuestro estudio constituye uno de los primeros que realizan este tipo de investigación y contribuyen a aclarar esta relación. Además, mientras que los investigadores anteriores que analizaron estas dos variables ignoraron las interrelaciones entre sus respectivas dimensiones, una de las contribuciones clave de este estudio es que amplía su enfoque a dichas dimensiones.

Por otro lado, en su mayor parte, los trabajos previos sobre la PSM y su teoría se han aplicado en países desarrollados en contextos culturales y estructurales occidentales. Desde la expansión de la



literatura sobre PSM, hasta ahora se han realizado muy pocas investigaciones en un contexto no occidental, especialmente en entornos culturales árabes (Belrhiti, et al., 2019; Hassan & Ahmad, 2021). Por ello, esperamos que nuestro estudio sea el punto de partida en Jordania y en los países vecinos para contribuir a la teoría de la PSM.

Este estudio también aporta una contribución metodológica, relativa a la forma en que estudiamos la relación entre la PSM y el rendimiento organizativo. Para investigar la influencia de la primera sobre el segundo, recurrimos al DEA bifásico, utilizando los datos del cuestionario para medir la PSM y regresando luego las puntuaciones de eficiencia de la 1ª etapa del DEA sobre esa medida de la PSM. Esta contribución concierne a dos disciplinas, situándose en la confluencia de la administración pública con la economía. Esto podría abrir una nueva vía en la literatura sobre la PSM para nuevas posibilidades y enfoques multidisciplinarios.

Nuestra idea se basa en la afirmación de que los métodos tradicionales que captan el rendimiento de las organizaciones se caracterizan por una gran cantidad de desventajas, lo que plantea la necesidad de desarrollar y adoptar nuevos métodos de evaluación. A partir de este punto surgió nuestra contribución mediante el uso del DEA, que ayuda a superar muchos puntos débiles y representa una herramienta relativamente libre de supuestos para evaluar el rendimiento de las organizaciones a través de las puntuaciones de eficiencia. Además, a pesar de la abundante literatura relativa a la medición del rendimiento del sector sanitario que utiliza el DEA, aún hay una escasez de producción académica empírica en los países en desarrollo, lo que podría deberse a la falta de disponibilidad de datos (Sultan & Crispim, 2018). En particular, en los países árabes, se realizaron cuatro estudios en el sector de la salud pública, sólo uno de los cuales en Jordania, y hasta ahora ningún estudio ha analizado el rendimiento organizativo en Jordania utilizando el DEA bifásico.

Además, nuestro estudio introduce una contribución metodológica muy importante e interesante en relación con los constructos de la PSM y el comportamiento ético, ya que desarrollamos una herramienta con índices muy robustos para la realidad del sector sanitario público jordano. Teniendo en cuenta que la mayor parte de la literatura sobre la

PSM se centra en mejorar la escala y desarrollarla, esto será una hoja de ruta para futuros investigadores. El EFA y el CFA mostraron que los resultados obtenidos en nuestro estudio empírico se ajustan a las dimensiones teóricas de la PSM y el comportamiento ético. Además, nuestro estudio arrojó luz sobre una cuestión metodológica referida a la originalidad de la COM como dimensión de la PSM como escala/constructo formativo único. Aunque esta cuestión había sido planteada recientemente por varios investigadores (es decir, Coursey, et al., 2011; Vandenabeele, 2008; Esteve, et al., 2016), este estudio añade evidencia empírica para reevaluar la necesidad de añadir la COM en el constructo de la PSM.

Según nuestros limitados conocimientos, el presente estudio es el primero que combina estas variables y las analiza en Jordania y más concretamente en el sector de la sanidad pública de este país. Esto colma una de las lagunas más importantes de las investigaciones anteriores, ya que la mayoría de ellas se centran únicamente en los países desarrollados. Además, nuestro estudio abarca todo el espectro de empleados de los hospitales públicos jordanos, mientras que, por el contrario, la mayoría de las investigaciones anteriores sobre la PSM se centran sobre todo en un estrato (por ejemplo, líderes, trabajadores ejecutivos, estudiantes, etc.).

En resumen, nuestro estudio consigue llenar las lagunas que se han presentado en el cuerpo del problema de investigación. En concreto, ayuda a aclarar la relación entre la PSM y el comportamiento ético, así como las relaciones entre sus dimensiones. También investiga la relación entre la PSM y el rendimiento organizativo utilizando una técnica diferente de las mediciones del rendimiento autodeclarado en las organizaciones públicas. Además, aborda la multitud de instrumentos o índices de la PSM y el comportamiento ético y la falta de un índice estándar, y comprueba la validez de la relación entre las variables estudiadas en entornos no occidentales.

## Limitaciones del estudio

Aunque nuestros resultados ayudan a comprender mejor la relación entre la PSM, el comportamiento ético y el rendimiento organizativo en el sector público jordano, este estudio está –como cualquier otro– sujeto a varias limitaciones empíricas.

En primer lugar, la primera parte de nuestra investigación se basa en un diseño transversal, lo que significa que difícilmente podemos inferir y captar la estricta causalidad entre la PSM, el comportamiento ético y el rendimiento organizativo. Aunque la causalidad ha sido razonada y basada en teorías, racionalidad lógica e interpretaciones lógicas, se ha sostenido que la única forma estricta de evaluarla –la causalidad– es mediante la realización de diseños experimentales durante un largo período de tiempo. En segundo lugar, nuestro estudio se ha llevado a cabo en un solo país y en un sector específico (el sector de la salud), por lo que se abre el debate sobre la generalizabilidad de los resultados, en el que se debe ser cauto.

En tercer lugar, los constructos de la PSM y el comportamiento ético eran escalas autoinformadas, lo que podría poner en peligro los datos debido a la deseabilidad social y el CMB. Utilizamos muchas técnicas para abordar estos problemas, incluyendo la Escala de Exageración dentro de los constructos de la PSM y el comportamiento ético para captar si los encuestados tienden a ser exagerados (Ludeke y Makransky, 2016). En este aspecto, nuestros resultados indican que los datos están libres del CMB. Además, aseguramos el anonimato de las respuestas de los encuestados y la información personal.

Para disminuir la probabilidad de que se produzca un sesgo de deseabilidad social, seguimos la técnica de Podsakoff et al. (2003), que ellos denominan técnica de "mejora de los ítems de la escala", evitando el uso de términos o afirmaciones vagas en cada ítem, de términos ambiguos o difíciles de entender para los encuestados y, por último, evitando las preguntas dobles (double-barrelled questions). Además, explicamos a los encuestados que este cuestionario es sólo para fines académicos y que sus datos serán confidenciales.

En cuarto lugar, está la limitación geográfica. Los hospitales en Jordania están esparcidos por todo el reino a grandes distancias, y el

Ministerio de Sanidad no aceptó distribuir el cuestionario por vía electrónica, debido a la falta de una base de datos unificada y completa para todos los hospitales. Esto obligó al investigador a viajar a Jordania y recorrer todo el país para recoger datos y realizar entrevistas con los directores de los hospitales. Esto supuso una pesada carga para el investigador pero, al final, el trabajo fue un éxito.

Por último, una de las limitaciones de esta tesis es que en la segunda parte de la misma, para probar la influencia de la PSM en el rendimiento organizacional, tuvimos que combinar las puntuaciones de eficiencia del DEA de varios años, estimadas a partir de datos secundarios proporcionados por el JMoH, con nuestros datos transversales de la PSM. Para ello, tuvimos que suponer la invariabilidad temporal de la PSM durante el trienio seleccionado (2019-21), justificando esta forma de proceder a partir de los trabajos originales de varios destacados estudiosos de la PSM que hallaron que esta tiene una naturaleza estable y necesita mucho tiempo para cambiar (Wright & Grant, 2010; Brænder & Anderson, 2013; Kjeldsen, 2014; Vogel & Kroll, 2016; Wright & Christensen, 2021).

A pesar de estas limitaciones, nuestro estudio proporciona un vínculo preliminar entre la PSM, el comportamiento ético y el rendimiento organizativo, constituyendo una aportación novedosa en el contexto de los países árabes y la literatura de Oriente Medio.

## RESUMO AMPLIADO

Esta Tese tivo por obxecto estudar a influencia da motivación do servizo público (PSM, xa que empregaremos con carácter xeral as siglas en inglés) no comportamento ético e o rendemento organizativo nos hospitais públicos xordanos que operan baixo a supervisión do Ministerio de Sanidade do Reino Hachemita de Xordania (HKJ). Tras a profunda revisión científica que se realizou, puxéronse de manifesto unha serie de flagrantes lagoas de investigación e coñecemento que é necesario emendar, o que definiu o problema do presente estudo e estableceu o seu marco para colmar unha serie destas lagoas. Con todo, este estudo dividiuse en dúas partes. Na primeira parte, investigamos varias lagoas relacionadas coa relación entre a PSM e o comportamento ético. Unha das lagoas máis importantes que se estudaron é a falta de probas empíricas sobre a relación entre a PSM e o comportamento ético, que segue sendo escasa.

Máis concretamente, este estudo arroxa luz sobre diversas lagoas de coñecemento neste campo de investigación, a saber: (i) a falta de estudos empíricos en moitos países, xa que a maior parte da literatura publicada respecto diso son estudos observacionais occidentais; (ii) o desacordo entre os investigadores sobre as dimensións do comportamento ético; (iii) a multitude de instrumentos ou índices de PSM e comportamento ético e a falta dun índice estándar; (iv) o número limitado de países do mundo que foron abordados ata o de agora por este tipo de investigación; e, en consonancia co último punto, (v) a validez da relación entre a PSM e o comportamento ético (EB) raramente púxose a proba en contornas non occidentais, con case ningunha investigación que examine a PSM e a súa influencia no comportamento ético nas organizacións públicas árabes; e, por último, (vi) a ausencia de calquera estudo local ou mundial anterior que examine as relacións de todos os aspectos da PSM individualmente con todas as dimensións do comportamento ético respectivamente.

A segunda parte do estudo está relacionada coa influencia da PSM no rendemento organizativo. Durante as dúas últimas décadas, as reformas do sector público tiveron como obxectivo aumentar o rendemento organizativo mediante a aplicación de ferramentas e métodos de xestión (Ritz, 2009). O principal problema nesta parte é o feito de que as reformas do sector público céntranse principalmente nas ferramentas de xestión en lugar de centrarse en constructos actitudinais como a PSM. Con todo, estudosos proactivos como Perry e Wise (1990), argumentaron non só que os traballadores do sector público teñen unha maior e máis forte ética de servizo público que os traballadores do sector privado, senón que o goberno pode utilizar esa ética para mellorar o seu rendemento e produtividade (Alonso & Lewis, 2001).

Numerosos especialistas estudaron a influencia e a relación entre a PSM e o rendemento organizativo (por exemplo, Le, 2005; Kim, (2004, 2016); Ritz, 2009; Miao et al., 2019; Zhu & Wu, 2016; Park, 2013; Mostafa & Leon-Cazares, 2016; Park & Le, 2020; Palma, Crisci & Mangia, 2020). Por iso é polo que moitos investigadores teñen salientado a relación relativamente positiva entre ambas as variables (por exemplo, Le, 2005; Kim, (2004, 2016)). Austen e Zacny (2015) argumentaron que a PSM afecta o rendemento dos traballadores das organizacións públicas e á eficacia organizativa. No que respecta especificamente á relación entre a PSM e o rendemento das organizacións sanitarias, Belrhiti et al. (2020) destacaron que está a recibir unha atención expoñencialmente crecente entre os responsables da toma de decisións, os investigadores, os académicos e as organizacións sanitarias internacionais.

Ao revisar esta literatura, Meier e Ou'Toole (2013a) aconsellaron encarecidamente non utilizar os métodos ordinarios, cales os baseados en enquisas, para medir o rendemento organizativo debido ao nesgo do método común (CMB). Estudaron como variable dependente o rendemento dos traballadores das escolas públicas comparando dous modelos diferentes que utilizan medicións externas do rendemento. Á luz das súas conclusións, suxeriron encarecidamente que non se utilizasen métodos baseados en enquisas e que se considerase de forma crítica calquera estudo existente con este tipo de medición. No mesmo

contexto, anteriormente, Andersen e Serritzlew (2012) utilizaron datos de arquivo para unha medida que podería conducir a un maior rendemento como un paso na dirección correcta. Con todo, os mecanismos que subxacen á relación entre a PSM e o rendemento organizativo do sector público seguen sendo, como eles mesmos os denominaron, unha "caixa negra" (Andrews & Boyne, 2010; Mostafa & Leon-Cazares, 2016). O noso estudo aborda esta lagoa investigando a influencia da PSM no rendemento organizativo definido pola eficiencia mediante o uso da DEA en dúas etapas.

Neste estudo utilizamos dous tipos de datos. En primeiro lugar, utilizamos datos orixinais recollidos a partir dun cuestionario que construímos para os fins do estudo. O investigador distribuíu o cuestionario autodeclarado entre os traballadores de todos os niveis organizativos e postos de traballo dos hospitais (é dicir, funcionarios, médicos, enfermeiras, directores, etc.). No momento da recollida de datos, o investigador tratou de distribuír unha parte dos cuestionarios a través do correo electrónico interno aos hospitais que se atopan lonxe da capital, Ammán, despois de pedir permiso para acceder aos seus empregados. Este correo electrónico consistía nunha breve descrición do obxectivo do estudo e da información relacionada coa recollida de datos, e nel aclarábase a confidencialidade dos datos e o seu uso unicamente con fins de investigación científica pura. Con todo, case todos os hospitais negáronse a recoller os datos a través desa vía, o que fixo necesario viaxar a Xordania e recoller os datos en persoa en cada hospital. Os cuestionarios distribuíronse mediante unha técnica de mostraxe aleatoria simple, na que o universo incluía a todos os traballadores dos hospitais públicos xordanos. O tamaño mínimo calculado para a mostra era de case 380 (379) pero, con todo, distribuímos 1.000 cuestionarios e recibimos 791 respostas, cunha taxa de resposta do 79%. A continuación, tras excluír os cuestionarios non válidos, quédannos 567 respostas válidas. Por outra banda, utilizamos datos secundarios do Ministerio de Sanidade de Xordania (JMoH) para os indicadores de input e output.

Sabendo que os compoñentes da PSM en asociación co comportamento ético nos países árabes, e especialmente no contexto do sector público xordano, non se investigaron previamente, a primeira

parte desta Tese tivo como obxectivo investigar a influencia da PSM coas súas dimensións estudadas [Atracción cara ao Servizo Público (APS), Abnegación(SS), Compañión (COM), Compromiso cos valores públicos (CPV)] no comportamento ético nos hospitais xordanos coas súas dimensións estudadas [Comportamento ético dun mesmo (EBS), Comportamento ético dos compañeiros de traballo (EBC), Liderazgo ético (ELS)]. Para lograr este obxectivo, construímos a nosa ferramenta baseándonos en medidas preestablecidas e prevalidadas de PSM (Kim et al., 2013), así como en Deshpande, Joseph & Prasad (2006) e Yukl et al. (2013) para medir o comportamento ético. Modificamos os constructos orixinais para adaptalos á natureza da cultura xordana, o que nos fixo dar un paso máis, desenvolvendo unha ferramenta de estudo para cada unha das variables consideradas e desenvolvéndoas de acordo coa realidade do estado dos hospitais públicos en Xordania; como porta de entrada e paso previo para futuros investigadores que queiran estudar estas variables en organizacións similares en Xordania ou no mundo árabe.

Dado que a maior parte da literatura sobre a PSM céntrase en mellorar a escala e desenvolvela, iso será unha folla de roteiro para futuros investigadores. Os resultados da nosa Análise Factorial Exploratoria (EFA) e a nosa Análise Factorial Confirmatoria (CFA) mostraron que o obtido no noso estudo empírico axústase ás dimensións teóricas da PSM e do comportamento ético. Ademais, eliminamos a variable COM do noso estudo. Isto arroxo luz sobre unha cuestión metodolóxica relativa á orixinalidade da COM como dimensión ou faceta da PSM como unha escala/constructo formativo único. Aínda que esta cuestión fora exposta recentemente por varios investigadores (por exemplo, Coursey, et al., 2011; Vandenabeele, 2008; Esteve, et al., 2016), este estudo engade evidencia empírica para reavaliar a necesidade de engadir a COM no constructo da PSM.

Despois de desenvolver a nosa ferramenta para a primeira parte da investigación, estimamos tres modelos principais mediante o modelado de ecuacións estruturais (SEM). Para comprobar a hipótese do estudo, os tres modelos estimados formáronse en tres niveles. En primeiro lugar, o modelo SEM de nivel uno, que consideraba a influencia da PSM no comportamento ético. En segundo lugar, o modelo SEM de



nivel dous, que comprobou a influencia das dimensións da PSM no comportamento ético. En terceiro lugar, o modelo SEM de nivel tres, que puxo a proba a influencia das dimensións da PSM nas dimensións do comportamento ético.

Todos os modelos SEM tiñan coeficientes beta positivos e resultaron ser estatisticamente significativos (Sig conxunta < 0,05). No primeiro modelo, a PSM no seu conxunto inflúe positivamente no comportamento ético dos empregados dos hospitais públicos xordanos ( $R^2 = 0,35$ ,  $\beta = 0,60$ ,  $Sig = 0,00$ ) e explica por si soa o 35,72% das variacións do comportamento ético dos devanditos empregados. Se o nivel da PSM aumenta nunha desviación estándar, o comportamento ético aumenta en 0,5977, sendo 0,5625 o valor do coeficiente de regresión non estandarizado estimado cun erro estándar de 0,03. No segundo modelo (o modelo SEM de nivel dous), cada unha das dimensións da PSM salvo a APS afectan ao EB de forma estatisticamente significativa, e explican colectivamente un 44,75% do comportamento ético. No caso de aumento da APS nunha desviación estándar, o comportamento ético aumentará en 0,0537 desviacións estándar, explicándose un 0,22% do comportamento ético nel. Se o SS aumenta nunha desviación estándar, o comportamento ético dos empregados do hospital aumentará en 0,0897 da desviación estándar, explicándose un 0,086% do comportamento ético. Se o CPV aumenta nunha desviación estándar, o comportamento ético aumentará en 0,5928 desviacións estándar, explicándose un 43,67% do comportamento ético.

No terceiro modelo SEM, os resultados indican que cada unha das dimensións da PSM salvo a APS afectan ao Comportamento Ético dun Mesmo de forma estatisticamente significativa e que, combinadas, explican un 54,59% do EBS. No caso de que a APS aumente nunha desviación estándar, o EBS incrementarase en 0,0463 da desviación estándar, explicándose un 0,16% do EBS. No caso do SS, se aumenta unha desviación estándar, o EBS incrementarase en 0,1052 da desviación estándar, explicándose un 1,06% do EBS. No caso do CPV, se aumenta unha desviación estándar, o EBS aumentará en 0,6557 da desviación estándar, explicándose un 53,36% da dimensión EBS do empregado. Ademais, a PSM coas súas dimensións explica un 17,00% do Comportamento Ético dos Compañeiros de Traballo, aínda que só o

CPV aféctalle significativamente. No caso da APS, se se incrementa nunha desviación estándar, o CBE se retrotraerá en 0,0848 da desviación estándar, explicándose un 0,098% do CBE. Do mesmo xeito, no caso do SS, se se incrementa nunha desviación estándar, o CBE reducirase nun 0,0475 da desviación estándar, explicándose un 0,11% do CBE. E no caso de que o CPV aumente nunha desviación estándar, o CBE sufrirá unha regresión de 0,4464 respecto á desviación estándar, explicándose un 15,72% do CBE.

Por último, as dimensións da PSM explican un 18,65% do Liderazgo Ético e todas elas resultaron ser estatisticamente significativas. No caso de que a APS aumente nunha desviación estándar, o ELS sufrirá unha regresión de 0,1812 da desviación estándar, explicándose un 5,13% da ELS. Da mesma maneira, no caso de que o SS aumente nunha desviación estándar, a ELS sufrirá unha regresión de 0,1408 da desviación estándar, explicándose un 0,98% da ELS. E no caso de que o CPV aumente nunha desviación estándar, o liderado ético sufrirá unha regresión de 0,2280 da desviación estándar, explicándose un 12,53% da ELS.

Na segunda parte desta Tese, aplicamos un modelo DEA bifásico para medir e explicar o rendemento organizativo, definido pola eficiencia produtiva nos hospitais do Ministerio de Sanidade. Utilizamos datos publicados polo Ministerio de Sanidade tras obter o permiso para utilizalos. Con este obxectivo en mente, nesta Tese, presentamos un novo marco empírico para analizar o rendemento utilizando os datos agregados da enquisa da PSM combinados cun conxunto de inputs e outputs dos informes publicados, en lugar de utilizar ferramentas baseadas en enquisas para medir o rendemento organizativo. Para lograr os obxectivos da segunda parte da Tese, utilizamos datos de panel de tres anos (2019-21) para obter puntuacións de eficiencia baseadas na DEA e estimar modelos econométricos que as expliquen.

Para levar a cabo a segunda etapa da DEA, enfrontámonos ás limitacións derivadas do número relativamente baixo de hospitais públicos existentes en Xordania e do carácter estritamente transversal dos nosos datos de PSM. Partindo do suposto plausible de que estes datos podían extrapolarse ao ano anterior e ao ano posterior á súa

recompilación, buscouse a maneira de triplicar as observacións explotando a mesma xanela de tres anos que xa se utilizou na primeira etapa da nosa DEA. Isto supuxo, con todo, considerar a PSM como unha variable invariante no tempo e impediu a súa introdución nos modelos de efectos fixos. Esta consideración apóiase no feito de que a PSM considérase unha propiedade estable (como un trazo), e só cambia lentamente co tempo, e despois de experiencias intensas, con atribución ao mecanismo de atracción-selección (Brænder & Anderson, 2013; Kjeldsen, 2014; Wright & Christensen, 2021). Para superar este obstáculo, recorreremos á utilización de dous tipos de modelos diferentes: os chamados modelos híbridos ou Within-Between (WB) e os modelos de filtrado de efectos fixos (FEF).

En primeiro lugar, estimamos o rendemento organizativo definido polas puntuacións de eficiencia na primeira etapa da DEA utilizando o software MaxDEA 8 Ultra. Calculamos as puntuacións de eficiencia utilizando o modelo multiplicador e o ancho da xanela foi de 3 (2019-21). Ao principio, estimamos tanto (1) os modelos CRS orientados ao input e ao output como (2) os modelos VRS orientados ao input e ao output, aínda que finalmente centrámonos nestes últimos. Os nosos datos de panel constaron de tres anos, e nosas DMUs foron 27 unidades, cun total de 81 observacións.

No primeiro conxunto de modelos de VRS (é dicir, os que teñen a PSM como variable explicativa), os resultados indicaron unha significación conxunta substancialmente maior (valores  $p < 0,05$  para o estatístico F) dos modelos para a eficiencia orientada aos inputs. Estes modelos explican ao redor dunha cuarta parte da variación total das puntuacións de eficiencia. Con todo, nos catro modelos, a PSM presenta coeficientes beta negativos. A pesar da súa falta de significación estatística, este resultado convida a considerar os posibles trade-offs entre a nosa limitada medida da eficiencia produtiva e outras dimensións de rendemento que poden ser relevantes desde a perspectiva da PSM.

No segundo conxunto de modelos WB (é dicir, os que teñen cada dimensión da PSM como variable explicativa da eficiencia no input), atopamos que as dimensións da PSM só aparecen como significativas no primeiro modelo (é dicir, o que ten a inclusión simultánea de todas

as dimensións da PSM), no que só o SS ten un coeficiente beta positivo, mentres que o resto de dimensións mostran coeficientes negativos. No terceiro conxunto de modelos WB (é dicir, aqueles en os que cada dimensión do PSM é unha variable explicativa da eficiencia no output), os resultados mostraron que, das dimensións da PSM, só a APS e o SS resultaron estatisticamente significativos no primeiro modelo (é dicir, aquel con inclusión simultánea de todas as dimensións do PSM). Doutra banda, nos outros tres modelos do mesmo conxunto, só a APS resultou ser estatisticamente significativa. En canto aos signos dos parámetros de pendente, son negativos para todas as dimensións, salvo o coeficiente positivo do SS no primeiro modelo.

Nos modelos FEF coa eficiencia no input como variable dependente, na primeira etapa, as nosas variables temporais introdúcense como regresores nun modelo de efectos fixos. O modelo axústase razoablemente ben ( $R^2 = 0,88$ ) e mostra unha elevada significación conxunta (valor  $p < 0,00000$  para o estatístico F). Pero as probas de significación individuais só permiten rexeitar a hipótese nula para as variables REFP, TIME e COVID19. A motivación de servizo público e as súas dimensións presentan, con todo, coeficientes beta negativos, salvo no caso do CPV, que ten o coeficiente máis próximo a cero. Así pois, os resultados do noso modelo FEF para a motivación de servizo público e as súas dúas primeiras dimensións leváronnos, de novo, a considerar os posibles trade-offs entre a eficiencia no input e outros criterios de rendemento máis vinculados á PSM.

Por último, o segundo modelo FEF coa eficiencia no output como variable dependente mostra, no seu primeiro paso, un axuste relativamente superior ao da eficiencia no input como variable dependente ( $R^2 = 0,95$ ). No segundo paso, a PSM e as súas dimensións non parecen ter ningunha influencia na eficiencia no output aos niveis de significación convencionais. Ademais, mostran coeficientes beta negativos, salvo no caso do CPV, que ten o coeficiente máis próximo a cero como no modelo FEF para a eficiencia no input. En consecuencia, os resultados do noso modelo FEF para a PSM e as súas dúas primeiras dimensións leváronnos, de novo, a considerar os posibles trade-offs entre a eficiencia no output e outros criterios de rendemento máis vinculados á PSM.

### **Principais contribucións desta investigación**

A partir do exposto, esta Tese contribúe á comprensión da relación entre a PSM, o comportamento ético e o rendemento organizativo de forma empírica e teórica nas literaturas da administración pública, o comportamento organizativo e a economía, desde diferentes perspectivas.

O noso estudo subliña a importancia da influencia da PSM no comportamento ético. En primeiro lugar, dadas as escasas contribucións que investigan a relación directa entre ambos (por exemplo, Lim Choi, 2004; Houston, 2006; Kwon, 2014; Maesschalck et al., 2008; Moynihan, 2010; Wright et al., 2016; Meyer-Sahling, et al., 2019), o noso estudo constitúe un dos primeiros que realizan este tipo de investigación e contribúen a aclarar esta relación. Ademais, mentres que os investigadores anteriores que analizaron estas dúas variables ignoraron as interrelacións entre as súas respectivas dimensións, unha das contribucións crave deste estudo é que amplía o seu enfoque ás devanditas dimensións.

Por outro lado, na súa maior parte, os traballos previos sobre a PSM e a súa teoría aplicáronse en países desenvolvidos en contextos culturais e estruturais occidentais. Desde a expansión da literatura sobre PSM, ata o de agora realizáronse moi poucas investigacións nun contexto non occidental, especialmente en contornas culturais árabes (Belrhiti, et al., 2019; Hassan & Ahmad, 2021). Por iso, esperamos que o noso estudo sexa o punto de partida en Xordania e nos países veciños para contribuír á teoría da PSM.

Este estudo tamén aporta unha achega metodolóxica, relativa á forma en que estudamos a relación entre a PSM e o rendemento organizativo. Para investigar a influencia da primeira sobre o segundo, recorreremos á DEA bifásica, utilizando os datos do cuestionario para medir a PSM e regresando daquela as puntuacións de eficiencia da 1ª etapa da DEA sobre esa medida da PSM. Esta contribución atinxe a dúas disciplinas, situándose na confluencia da administración pública coa economía. Isto podería abrir unha nova vía na literatura sobre a PSM para novas posibilidades e enfoques multidisciplinares.

A nosa idea baséase na afirmación de que os métodos tradicionais que captan o rendemento das organizacións caracterízanse por unha

gran cantidade de desvantaxes, o que expón a necesidade de desenvolver e adoptar novos métodos de avaliación. A partir deste punto xurdiu a nosa contribución mediante o uso da DEA, que axuda a superar moitos puntos débiles e representa unha ferramenta relativamente libre de supostos para avaliar o rendemento das organizacións a través das puntuacións de eficiencia. Ademais, a pesar da abundante literatura relativa á medición do rendemento do sector sanitario que utiliza a DEA, aínda hai unha escaseza de produción académica empírica nos países en desenvolvemento, o que podería deberse á falta de dispoñibilidade de datos (Sultan & Crispim, 2018). En particular, nos países árabes, realizáronse catro estudos no sector da saúde pública, só un dos cales en Xordania, e ata o de agora ningún estudo analizou o rendemento organizativo en Xordania utilizando a DEA bifásica.

Ademais, o noso estudo introduce unha contribución metodolóxica moi importante e interesante en relación cos constructos da PSM e o comportamento ético, xa que desenvolvemos unha ferramenta con índices moi robustos para a realidade do sector sanitario público xordano. Tendo en conta que a maior parte da literatura sobre a PSM céntrase en mellorar a escala e desenvolve-la, isto será unha folla de roteiro para futuros investigadores. A EFA e a CFA mostraron que os resultados obtidos no noso estudo empírico axústanse ás dimensións teóricas da PSM e o comportamento ético. Ademais, o noso estudo arroxo luz sobre unha cuestión metodolóxica referida á orixinalidade da COM como dimensión da PSM como escala/constructo formativo único. Aínda que esta cuestión fora exposta recentemente por varios investigadores (é dicir, Coursey, et al., 2011; Vandenabeele, 2008; Esteve, et al., 2016), este estudo engade evidencia empírica para reavaliar a necesidade de engadir a COM no constructo da PSM.

Segundo os nosos limitados coñecementos, o presente estudo é o primeiro que combina estas variables e análizaas en Xordania e máis concretamente no sector da sanidade pública deste país. Isto colma unha das lagoas máis importantes das investigacións anteriores, xa que a maioría delas céntranse unicamente nos países desenvolvidos. Ademais, o noso estudo abarca todo o espectro de empregados dos hospitais públicos xordanos, mentres que, pola contra, a maioría das

investigacións anteriores sobre a PSM céntranse sobre todo nun estrato (por exemplo, líderes, traballadores executivos, estudantes, etc.).

En resumo, o noso estudo consegue encher as lagoas que se presentaron no corpo do problema de investigación. En concreto, axuda a aclarar a relación entre a PSM e o comportamento ético, así como as relacións entre as súas dimensións. Tamén investiga a relación entre a PSM e o rendemento organizativo utilizando unha técnica diferente das medicións do rendemento autodeclarado nas organizacións públicas. Ademais, aborda a multitude de instrumentos ou índices da PSM e o comportamento ético e a falta dun índice estándar, e comproba a validez da relación entre as variables estudadas en contornas non occidentais.

### **Limitacións do estudo**

Aínda que os nosos resultados axudan a comprender mellor a relación entre a PSM, o comportamento ético e o rendemento organizativo no sector público xordano, este estudo está –como calquera outro– suxeito a varias limitacións empíricas.

En primeiro lugar, a primeira parte da nosa investigación baséase nun deseño transversal, o que significa que dificilmente podemos inferir e captar a estrita causalidade entre a PSM, o comportamento ético e o rendemento organizativo. Aínda que a causalidade foi razoada e baseada en teorías, racionalidade lóxica e interpretacións lóxicas, tense sostido que a única forma estrita de avaliala –a causalidade– é mediante a realización de deseños experimentais durante un longo período de tempo. En segundo lugar, o noso estudo levouse a cabo nun só país e nun sector específico (o sector da saúde), polo que se abre o debate sobre a xeralizabilidade dos resultados, no que se debe ser cauto.

En terceiro lugar, os constructos da PSM e o comportamento ético eran escalas autoinformadas, o que podería poñer en perigo os datos debido á deseabilidade social e o CMB. Utilizamos moitas técnicas para abordar estes problemas, incluíndo a Escala de Esaxeración dentro dos constructos da PSM e o comportamento ético para captar se os enquisados tenden a ser esaxerados (Ludeke e Makransky, 2016). Neste aspecto, os nosos resultados indican que os datos están libres do CMB. Ademais, aseguramos o anonimato das respostas dos enquisados e a información persoal.

Para diminuír a probabilidade de que se produza un nesgo de deseabilidade social, seguimos a técnica de Podsakoff et al. (2003), que eles denominan técnica de "mellora dos ítems da escala", evitando o uso de termos ou afirmacións vagas en cada ítem, o emprego de termos ambiguos ou difíciles de entender para os enquisados e, por último, evitando as preguntas dobres (double-barrelled questions). Ademais, explicamos aos enquisados que este cuestionario é só para fins académicos e que os seus datos serán confidenciais.

En cuarto lugar, está a limitación xeográfica. Os hospitais en Xordania están espallados por todo o reino a grandes distancias, e o Ministerio de Sanidade non aceptou distribuír o cuestionario por vía electrónica, debido á falta dunha base de datos unificada e completa para todos os hospitais. Isto obrigou ao investigador a viaxar a Xordania e percorrer todo o país para recoller datos e realizar entrevistas cos directores dos hospitais. Isto supuxo unha pesada carga para o investigador pero, ao final, o traballo foi un éxito.

Por último, unha das limitacións desta Tese é que na segunda parte da mesma, para probar a influencia da PSM no rendemento organizativo, tivemos que combinar as puntuacións de eficiencia da DEA de varios anos, estimadas a partir de datos secundarios proporcionados polo JMoH, cos nosos datos transversais da PSM. Para iso, tivemos que supoñer a invariabilidade temporal da PSM durante o trienio seleccionado (2019-21), xustificando esta forma de proceder a partir dos traballos orixinais de varios destacados estudosos da PSM que acharon que esta ten unha natureza estable e necesita moito tempo para cambiar (Wright & Grant, 2010; Brænder & Anderson, 2013; Kjeldsen, 2014; Vogel & Kroll, 2016; Wright & Christensen, 2021).

A pesar destas limitacións, o noso estudo proporciona un vínculo preliminar entre a PSM, o comportamento ético e o rendemento organizativo, constituíndo unha aportación novedosa no contexto dos países árabes e a literatura de Oriente Medio.





## LIST OF ABBREVIATIONS

ABS	Absolute Value
AGFI	Adjusted Goodness of Fit Index
AIC	Akaike's information criterion
APS	Attraction to Public Service
BCC	Bayesian information criterion
BIC	Standard Bayesian Information Criterion
CAIC	Consistent Version of Akaike's information criterion
CFA	Confirmatory Factor Analysis
CFI (RNI)	Comparative Fit Index
CMB	Common Method Bias
CMV	Common Method Varians
CPV	Commitment to Public Values
CRS	Constant Returns to Scale
DEA	Data Envelopment Analysis
DUMs	Decision-Making Units
EBC	Ethical Behavior of Co-workers
EBS	Ethical Behavior of Self
EFA	Exploratory Factor Analysis
ELS	Ethical Leadership
FEF	Fixed-Effects Filtered
GFI	Goodness of Fit Index
HKJ	Hashemite Kingdom of Jordan
IFI	Incremental fit index
JMoH	Jordanian Ministry of Health
KMO	Kaiser–Meyer–Olkin
MLE	Maximum likelihood estimation
NFI	Normed Fit Index
PSM	Public Service Motivation

PSM-ed	Public Service Motivated
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual
SS	Self-Sucrifice
TLI	Tucker–Lewis index
VIFs	Inner Variance Inflation Factors
VRS	Variable Returns to Scale
WB	Within-Between
TAT	Thematic Appreciation Test
PSE	Picture Story Exercise
SJ	Social Justice
FF	Fear of Failure
HS	Hope of Success
nPow	Need for Power
nAff	Need for Affiliation
nAch	Need for Achievement
SET	Social Exchange Theory
APM	Attraction to Policy Making
EFQM	European Foundation for Quality Management
PPF	Production Possibility Frontier
PPC	Production Possibility Curve
RE	Relative Efficiency
TE	Technical Efficiency
PTE	Pure Technical Efficiency
AE	Allocative Efficiency
EE	Economic Efficiency
PE	Pareto Efficiency
CCR	Charnes, Cooper, and Rhodes
BCC	Banker, Charnes, and Cooper
EFQM	European Foundation for Quality Management
MR	Magnetic Resonance

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# CHAPTER I: INTRODUCTION AND OBJECTIVES

## 1.1 INTRODUCTION

The Hashemite Kingdom of Jordan (HKJ) faces internal and external challenges and threats that pose a significant existential hazard to its security and stability. Such challenges are fraught with dangers that decision-makers cannot ignore. Regardless of the regional and international competition for the Middle East chessboard, successful political experiences must be adapted to mobilise citizens behind their leadership and government to enhance security and stability at all levels to face challenges and threats. One of the most concerning challenges is poverty, which has become chronic due to the imbalances between financial and economic resources on the one hand and the increase in population as a result of (refugee waves) on the other hand.

In 2021, Jordan's population was 10.2 million citizens compared to 7.2 million in 2011 ([Jordanian Department of Statistics Directorate of Household Surveys, 2021](#)). This increasing due to the wave of refugee brothers from Iraq, Yemen, Syria, Libya, and Palestine, with more than 55 Arab and international nationalities in Jordan. The Jordanian population growth rate in 2020 was 2.36 % ([United Nations, 2020](#)) and 3.4% in 2021, as one of the highest globally. Indeed, these challenges facing the Kingdom have cast a heavy shadow on many sectors, one of the most important of them is the health sector. This, and the public health sector especially, represents one of the main challenges that face the HKJ. The most prominent factors underlying this challenge are the steady population growth, the stereotypical transformation of diseases, and the high proportion of elderly and young people, which creates the need to pay attention to healthcare organisations and to identify the foundations that support their progress, as well as to improve them and

increase their efficiency and effectiveness to ensure their continuity without affecting their performance.

However, organisations are based on a number of foundations, one of which is financial and non-financial resources, where non-financial resources include human resources and non-human resources. The human resource - employees - is the organisation's most important resource. Its intellectual and cognitive capital and the mindset its vision, mission, goals, and strategies. It is an essential tool for implementing the organisation's work and strategy and achieving its goals. The intellectual and practical contributions of the human resource are the basis for fulfilling the organisation's purposes, and the employees are one of the most important entrances to gaining the competitive advantage of organisations (Salajeghea & Asgharpour, 2014; Aroniyaso, 2016).

What distinguishes the human resource from all other organisation resources is the mind and its psychological and social dimension. Organisations need employees who are psychologically related to their work in the present and the future (van Rossenberg et al., 2018). No governmental or private organisation can develop its efficiency and effectiveness unless - until - it has efficient and effective employees (Saeed et al., 2017), which presupposes the willingness and desire of its employees to cooperate with it (Salajeghea & Asgharpour, 2014). According to Salajeghea and Asgharpour (2014), cooperation is of two types: (i) compulsory cooperation and (ii) spontaneous deliberate cooperation; the difference between them is that the employee cooperates compulsorily by the laws, regulations, instructions and organisational standards, while in the case of deliberate automatic cooperation, the employee voluntarily uses his effort, energy and foresight to flourish and develop their capabilities for the benefit of themselves and the interest of the organisation.

For the organisation to work efficiently, its employees must work efficiently. The efficiency of the employees - and thus the efficiency of the organisation - is affected by a proliferation of factors, including the strategy of human resources management and the functions of this strategy such as recruitment, selection, organisational justice, organisational climate, organisational development and promotion,

including job satisfaction, and motivation. Employee motivation plays a vital role practically and theoretically within management literature, where some scholars promote the idea that motivation must be interpreted as a heterogeneous topic (Camilleri & Van Der Heijden, 2007). Moreover, motivation is a vast topic with different dimensions and measurements depending on the theory or concept. Nevertheless, public service motivation (PSM) focuses on motivation linked to public administration organisations and entities. It is defined as the tendency for public officials to prefer to work in public organisations. Perry (1996), in his definition of the theory of PSM, mainly referred to individuals' motives, where those motives are overwhelmed by the tincture of psychological needs. In other words, Vandenabeele (2007) explains those psychological needs by defining PSM as a set of value-laden behavioural determinants (i.e., beliefs, attitudes, values, and organisational interests) that motivate individuals to think about what is the most appropriate for society and then act accordingly. That reflects the idea that PSM is related to public morality, and as a response, it motivates individuals to control their selfishness and self-interest (Staats, 1988). Furthermore, Perry argued that an individual's PSM level affects many factors within a public service organisation, such as organisational performance, effectiveness, job choice, and ethics (Houston, 2006).

According to pioneer studies, including Perry and Wise (1990) and Perry (1996), it is assumed that employees in public sectors carry a motivation and zeal for serving the public, which is not present in private sector employees. Since the beginning, the public sector has been emphasised as a responsibility, a duty, and a calling rather than just a job since employees in the public sector are expected to be driven by the ethics of serving the public, as opposed to employees in private sector organisations Zubair et al. (2021). Nowadays, ethics considers one of the requirements of organisations is to develop a sense of morality and a pattern of ethical behaviour among employees. Ethical behaviour can be defined as the quality of acting by relevant moral values, norms, and rules (Ripoll & Ballart, 2019). It attracts academic, professional, and public attention in public-sector organisations (Abdel Meguid, 2011). It can be argued that the ethical bar is set somewhat

higher in public-sector organisations than in other sectors. In this regard, violations of ethical behaviour seem to be of common occurrence among public-sector employees, both in developing and developed countries. This can sabotage trust in government and foster corruption, among other organisational ails of such violations (Meyer-Sahling, Schuster, and Mikkelsen, 2018; OPM, 2012; Kolthoff et al., 2010). Hence, retaining high ethical standards in the public sector is highly important.

Public service motivation (PSM) is anticipated to be one of the fundamental driving forces of ethical behaviour in the public sector. It has an essential influence on a person's willingness to join a public organisation and remain in it (Potipiroon & Ford, 2017). Over the past three decades, interest in and research on the PSM has increased enormously (e.g., Schott et al., 2019; Ritz, Brewer & Neumann 2016). Public service motivation has noticeable ethical implications. Some researchers have already linked it with ethical behaviour in the public sector (e.g., Ripoll, 2018; Jensen & Vestergaard, 2016; Wright et al., 2016). Specifically, the employees with high PSM are expected to reveal a higher level of ethical behaviour than their counterparts demonstrating low PSM because the moral behaviour is highly dependent on the underlying values and ideals that shape the employee's personality and guide their conduct (Christensen & Wright, 2018).

Additionally, many researchers found evidence to suggest that PSM is a concept found in many contexts in different cultures and countries under other names and appearances. Such as, in the United Kingdom, PSM is described as *public service ethos*, and in France, public administrators speak of *l'éthique du bien commun* (Chanlat, 2003). Therefore, Vandenabeele et al. (2004) suggested that the widespread and extensive emergence of PSM and PSM-like constructs in numerous countries implies the presence of a robust phenomenon that is entrenched in Western culture. However, regardless of the general advancement of understanding of the importance of PSM for public-sector organisations, its precise role in different contexts remains not much evident, especially in Arab countries (and predominately in

the HKJ) where no investigations of the link between these two variables have so far been made (Alreshoodi, 2016).

Administrations of the various organisations pay great attention to the human element by searching for the factors affecting workers' productivity, performance, and efficiency, as officials seek those workers can reach their efficiency to the maximum possible level. However, ability alone is not sufficient for the employee to work as efficiently as possible if no motive drives them to work, as the efficiency of the individual depends on two essential elements: the ability and desire to work. The ability to work is represented by the individual's skills, knowledge and capabilities in addition to the personal readiness and the powers that education and training development. The desire to work is represented in the motivation that pushes the individual's behaviour in the direction that achieves the goals of the institution, and the motivation process is represented in the external factors and influences that encourage the individual to increase their performance.

Research about PSM has uprooted rapidly in the last two decades. Perry and Wise (1990) elaborate that PSM has an influence on employees' behaviour in three different manners: namely (a) as the level of PSM escalates, individuals are more oriented toward working in public sector organisations (b) public service motivation is significantly correlated with the performance of employees in public organisations and those ( c ) public organisations are comprised of a higher number of employees having higher degrees of PSM and are not necessarily in need for extrinsic incentives to fulfil their motivation. Ever since this seminal work of Perry and Wise, exponential interest in PSM in the literature has been proven (Ritz *et al.*, 2016). One area of most significant attraction of concern is the role of PSM in enhancing the performance of organisations (Brewer, 2008). Consequently, the association between PSM and performance has received increased attention in the past decade (e.g., Naff & Crum, 1999; Alonso & Lewis, 2001; Vandenabeele, 2009; Schott *et al.*, 2015; Zhu & Wu 2016; Miao *et al.*, 2019), albeit there is limited knowledge concerning the mechanisms that lie beneath its effects (Perry *et al.*, 2010).



However, performance could be very complex due to many components that constitute its essence, stemming this complexity from the lack of existing homogeneous measurements for it. From an organisational perspective, having a model that reasonably depicts employee performance in general and straightforward terms is highly desirable (Camilleri & Van Der Heijden, 2007). Within this context, Miao *et al.* (2019) argued that PSM heightens the level of performance. Still, it could be not easy to measure it in the public sector because those measurements most of the time refer to the efficiency and effectiveness of the private sector, as Pollitt (2018) emphasised. Although there is no tangible link between the relationship between PSM and performance until now, this calls for a more refined theoretical framework that resembles recent developments in research on the relationship between PSM and performance.

Within the framework of the HKJ's Institute of Public Administration (IPA) endeavour, by all means, this institution has tried to encourage public sector employees to raise the levels of efficiency and excellence in performance spread the spirit of positivity, and provide them with the necessary skills, which is reflected in their dedication to work, success, and investment of their abilities to achieve themselves and serve their country. The IPA is developing an initiative to motivate Jordanian public sector employees who ranked first in various of its training courses, as one of the essential tools to consolidate a culture of excellence that is reflected in individual and institutional performance. This would lead to developing the system of government and contribute to achieving sustainable administrative action.

The decisions and behaviours of public officials are a practical expression of public policies, that is, the policies of the government sector. Therefore, the legitimacy of governmental organisations is based on the motivation and commitment of public officials to work and act according to the interest of their organisation and the interest of the citizens which this organisation services. The motivation of these officials is important because - or very important quite a few of them - they will be decision-makers and policymakers in the future, in addition to the importance of that motivation in the quality of service provided

by the government institution to citizens and the role of that motivation in building the image of the institution and achieving and sustaining the desired positive organisational outcomes (Olaajo et al., 2017).

Accordingly, ensuring civil workers' ethical behaviour and performance is an inherent democratic concern of most countries and a lofty task for government administrators. However, our knowledge of how public managers influence their employees' ethical behaviour and performance through PSM is limited in light of the lack of such studies. Despite the preceding, it is noteworthy that the relationship between PSM in its various dimensions and the multiple sizes of ethical behaviour, and the relation between PSM and performance using DEA in Jordanian public organisations, primarily in the public hospitals, has not been studied before. Therefore, the current study aims to study the impact of PSM on ethical behaviour and performance in the HKJ.

This study represents a qualitative addition to the research of public administration science in general. The fields of human resource management practice, organisational behaviour, and economics in particular because:

- it will determine the nature and strength of the relationships between the dimensions of PSM, performance and the dimensions of ethical behaviour in public hospitals as one of the categories of public sector organisations;
- it estimates the impact of PSM on performance using DEA as a substitute for the common performance measurements; and
- it develops the measurement tools of PSM and ethical behaviour in the context of Arab countries, where there is a considerable gap in the middle eastern literature when it comes to these two variables (Alreshoodi, 2016).

The review of the scientific literature confirms that it is the first study in the world (within the limited knowledge of the researcher) that examines the relationships between these three variables in general and their dimensions mentioned above in hospitals. Linking ethical behaviour and performance to PSM will help to achieve a deeper understanding of the motivational foundations and pillars for ethical

conduct and performance in the governmental sector and will highlight the effectiveness of the performance capabilities of the management team in this sector.

The results of this study will contribute to defining the levels of the dimensions of PSM and the dimensions of ethical behaviour and performance in Jordanian public hospitals. It will diagnose the strengths and the shortcomings in these three variables, devote the strengths and develop plans and programs that will lead to improve PSM, overcome the organisational weaknesses and increase their sensation of ethics and performance. Levels of employee satisfaction, work engagement, performance, and productivity will strengthen the ethical behaviour climate and establish culture ethics in these hospitals, improving organisational performance and productivity and increasing success. This vision is supported by the results of many studies (e.g., [Naff & Crum, 1999](#); [Lim Choi 2004](#); [Kwon, 2014](#); [Stazyk & Davis 2015](#); [Miao et al., 2019](#)), where the current study offers a model to shed some light on the psychological origin of PSM, which will co-define the future empirical agenda.

In conclusion, although the Social Exchange Theory states in one of its central assumptions the symmetry and harmony between sectors and the convergence and intersection of these sectors, and supports that the pattern and method for employees to establish psychological bonds with their work and develop them are identical in all work contexts and work organisations, that is, all sectors of work, and it is generalisable, but in the current study, we agree with [van Rossenberg et al. \(2018\)](#), who sees that the sectors differ from each other in many aspects; therefore, we suggest that the results of this study, which is concerned with the public sector, are generalisable.

## **1.2 STATEMENT OF PROBLEM AND RESEARCH GAPS**

The researcher has always been interested in the relationship between ethical behaviour and PSM in public sector institutions. This interest has led him to review the relevant scientific literature to identify this relationship. This scientific review has revealed a number of flagrant research and knowledge gaps that require bridging, which defined the problem of the current study, drew its framework and established this

study that works on filling a number of these gaps, as will be explained in the following paragraphs.

Some researchers and public administration scholars (e.g., Ripoll, 2018; Meyer-Sahling *et al.*, 2018; Wright *et al.* 2016) have underscored the potential contribution of employee PSM to their ethical behaviour. Numerous scholars and researchers have found links between PSM with ethical behaviour in public sector organisations (e.g., Christensen & Wright, 2018, Meyer-Sahling *et al.*, 2018, Ripoll, 2018; Wright *et al.*, 2016; and Perry, 2011). Theory and studies have shown that public service employees are more worried about ethical factors than ordinary people and other individuals in other sectors (Abdel-Meguid, 2011). However, empirical evidence on the relationship between PSM and ethical behaviour remains scarce (e.g., Gans-Morse, *et al.*, 2019; Meyer-Sahling, *et al.*, 2018), especially in Arab countries.

Many researchers (e.g., Meyer-Sahling *et al.*, 2018; Wright, Hassan, & Park, 2016; Stazyk & Davis 2015) argue for the important and substantive role of PSM and ethical behaviour in the prevention of corruption and unethical behaviour in the public sector (PS) field. Moreover, PSM influences a person's willingness to join and remain in a public organisation and remain in it and their ethical behaviour in organisational and social contexts (Perry, 2011). In line with this, Bellé (2013) stated that PSM may benefit not only performance, as prior studies had suggested (e.g., Boyd-Swan & Molina, 2019; Salminen & Mäntyselä, 2013), but also integrity in the public sector. Nonetheless, as far as the relationship between these two variables is concerned, a review of the PSM and ethical behaviour literature highlights several noteworthy knowledge gaps, as illustrated in the following paragraphs.

One of the noticeable knowledge gaps is limited investigations of the relationship between PSM and ethical behaviour in the public sector worldwide. Some researchers spotlighted the extremely limited studies of this relationship globally. For instance, Meyer-Sahling (2018) said:

*“Public service motivation (PSM) and ethical behaviour are central concerns in public administration. Yet, experimental evidence on the causes of ethical behaviour and the causal effects of PSM remains scarce, curtailing our understanding of both.” (Meyer-Sahling et al., 2018).*

This issue has been even recently pointed out by [Gans-Morse et al. \(2019\)](#), who brought to notice that investigations of the relation between PSM and ethical behaviour have been limited thus far. In agreement with this, the most recent review (August 2020) of the published literature retrieved only four relevant studies, three of them published earlier than 2014.

[Wright et al. \(2016\)](#) and [Meyer-Sahling et al. \(2018\)](#) stated that there are indications that the PSM has the potential to establish an ethical atmosphere in an organisation, and activation enhances willingness to report ethical problems (*un-ethical behaviour*) to management. In harmony with this, [Perry \(2011\)](#) pointed out that PSM influences ethical behaviour in organisational and social contexts, as manifested in such behaviours. Though, a noticeable knowledge gap in this area of research is the mixed findings on the impact of PSM on ethical behaviour. Albeit some researchers support that PSM has positive effects on ethical behaviour (e.g., [Ripoll & Ballart, 2019](#); [Wright et al., 2016](#); [Stazyk & Davis, 2015](#); [Ripoll, 2018](#)).

Alternatively, other researchers, such as [Christensen & Wright \(2018\)](#), sought to empirically articulate the link between variables (PSM and ethical behaviour) with evidence from three experimental studies. Still, they fail to confirm that relationship contrary to expectations; the researchers attributed this failure in linking the two variables to other factors, including the weaknesses in how the variables were operationalised or characteristics of the study sample or conditions. Controversies in findings on the association of PSM with ethical behaviour will ever exist. This stresses the need to systematically and comprehensively study the influence of PSM on ethical behaviour.

Apart from limited research into the link between ethical behaviour and PSM, and the mixed results of earlier studies, this study sheds light on six other limitations that draw further knowledge gaps in this field of research: (i) the lack of empirical studies since most of the related published literature are western observational studies; (ii) disagreement among researchers on the dimensions of ethical behaviour; (iii) the multitude of PSM and ethical behaviour instruments or indices and lack of a standard index; and (iv) the limited number of the world countries that have been addressed until now by this type of research; and, in harmony with the last point, (vi) the validity of the relationship between the two variables has rarely been tested in Non-Western environments, with almost no research examining PSM and its impact on ethical behaviour in Arab public organisations.

There is another issue that represents the knowledge and research gap, which in turn contributed to determining and defining the study problem of the current study, which is the absence of any previous local or global study that examined the relationships of all aspects of PSM individually with all dimensions of ethical behaviour respectively; therefore, we will study the interconnected relationships between the sub-dimensions of the main study variables to see if there is an effect of the PSM dimensions on the dimensions of ethical behaviour.

The study problem of the current study was supplemented by another remarkable gap, which is that a number of researchers mixed their concepts of several ethical behaviour variables and used two or more of them as synonyms. These variables included (unethical behaviour), (ethical conduct), (work ethics), (professional ethics), (ethical Intention), and the most confusion between ethical behaviour and moral behaviour. The thing that deludes the reader is that the ethical behaviour variable has been used extensively for more than two decades, despite the fact that the situation is the opposite of that, and despite the difference between these variables in their meanings. we think that this confusion is due to two main reasons at the same time, namely (a) the great convergence between these variables in their definitions and the precision of the lines separating the meanings of these variables, and (b) the great similarity of variables dimensions in most of the cases. The present study deals with this problem by placing

the concepts in their correct context and by focusing - as a result - on ethical behaviour only according to its definition contained in the introduction to this dissertation and the definitions that will be presented and analysed later in the literature framework of this study.

In addition to what has been stated before, we agree with Meyer-Sahling *et al.* (2018) that the prevailing perception that PSM has a positive effect on the ethical behaviour of public sector employees is still without definitive scientific evidence, and accordingly, this study sheds light on a number of questions left by the relevant local and international scientific research unanswered, this has made the scientific, research and administrative community had limited knowledge of what PSM means for ethical behaviour in public sector institutions.

The other fold of the study problem is concerning the influence of PSM on organisational performance. For the past two decades, public sector developments aimed to increase organisational performance by implementing managerial tools and methods Ritz (2009). The foremost problem in this part is the fact that the public sector reforms mainly focus on managerial tools rather than focusing on attitudinal constructs such as PSM. However, scholars such as Perry and Wise (1990), argued that not only that public sector workers have a greater and strong public service ethic than private-sector workers, but that government can utilize that ethic to improve its performance and productivity Alonso & Lewis (2001).

The interest in health organizational performance has increased exponentially among decision-makers, researchers, scholars, and international health organizations Belrhiti *et al.* (2020). Numerous scholars, however, had studied the effect and relationship between PSM and organisational performance (e.g., Lee, 2005; Kim, (2004, 2016); Ritz, 2009; Miao *et al.*, 2019; Zhu & Wu, 2016; Park, 2013; Mostafa & Leon-Cazares, 2016; Park & Lee, 2020; Palma, Crisci & Mangia, 2020). Hence, many researchers had emphasized the relatively positive relationship between PSM and organisational performance, (e.g., Lee, 2005; Kim, (2004, 2016)). It has been argued by Austen and Zacny (2015) that PSM affects the public organization's worker's performance and organizational effectiveness.

Theorized management scholars have been supported by economists regarding the nature of the relationship between PSM and performance improvements (Bayram & Zoubi, 2020). Where the peak of those economists' thinking goes so far as to consider PSM is the (*Raison D'être*s or *Reason of Being*) of governmental support (Francois, 2000).

Nevertheless, performance measurements have a longstanding tradition in public policy and public administration, and they have found fecund ground in the public healthcare sector Arah *et al.* (2003); Vainieri *et al.* (2019). From the 1960s to the present day, the methods used by researchers to measure performance in health organizations, especially hospitals have varied, and these measurements have been accompanied with multi-dimensional performance measurements to measure the financial and non-financial performance in both profit and non-profit healthcare sectors, henceforth, these measurements have many methods (such as Traditional Control Measurement Systems, Organizational Growth, Accounting-based Metrics, Data Envelopment Analysis, Stakeholders Approach), Pfeffer, (1973); Pink *et al.* (2001); Hassan, (2005); Sedatole *et al.* (2013); Vainieri *et al.* (2019).

Moreover, the literature highlights not only the abovementioned methods but also there are other methods that can capture and evaluate the performance of the hospitals, for instance, Data Envelopment Analysis – (DEA), Karahan, (2018); Sultan & Crispim, (2016); Pitocco, Sexton & Stickle, (2020). In traditional form, DEA is a linear programming technique, that calculates the performance of similar decision-making units (DMUs) that have both inputs and outputs Ghahremanloo *et al.* (2020). Consequently, DEA models can provide new solutions to increase the efficiency and identify the optimal ways of efficiency for each of the hospitals rather than the averages Karahan, (2018).

Data Envelopment Analysis (DEA) obtained extensive acceptance by academics and practitioners in many public and private sectors Bahurmoz, (1999). Due to the massive usage of DEA models and their advantages in evaluating the performance and the efficiency of public hospitals, numerous studies from all over the world with different environments have been conducted using them (e.g., Alatawi, Niessen,



& Khan, 2020; Nguyen & Zelenyuk, 2020; Barpanda & Sreekumar,2020; Giancotti, Sulku, Pipitone & Mauro 2020; Zhao et al., 2020); Küçük, Özsoy & Balkan, 2020); Seddighi, Nejad & Basakha, 2020; Halverson, 2020; Harikumar & Saleeshya, 2020).

Seemingly, no previous research has explored the effect of PSM on organisational performance using DEA as a performance indicator combined. We, therefore, studied the effect of PSM and investigated whether it could affect the ethical behaviour and organizational performance in the Jordanian public hospitals using a combined survey and two-stage DEA model to evaluate the overall performance and efficiency. Where the originality of this study is that it is one of the first studies -if it is not the first- to use this methodology to assess the efficiency and performance of public hospitals in Jordan.

Based on the research problem this dissertation seeks to answer the following research questions:

- Research Question 1: **RQ1**- what is the level of PSM in Jordanian public hospitals?
- Research Question 2: **RQ2**- what are the differences between the sociodemographic variables in the Jordanian public hospitals, yielded to PSM?
- Research Question 3: **RQ3**- what is the level of ethical behaviour in Jordanian public hospitals?
- Research Question 4: **RQ4**- what is the differences between the sociodemographic variables in the Jordanian public hospitals, yielded to ethical behaviour?
- Research Question 5: **RQ5**- what is the influence of PSM on ethical behaviour in Jordanian public hospitals?
- Research Question 6: **RQ6**- what is the level of organizational performance in Jordanian public hospitals?
- Research Question 7: **RQ7**- what is the influence of PSM on organizational performance in Jordanian public hospitals?

The levels of PSM, ethical behaviour and performance prevailing in the Jordanian hospitals need first monitoring and documentation, then an analysis of how they can be strengthened, followed by the development and implementation of appropriate plans and programs,

then follow-up and evaluation of their results to see the extent of their success in achieving the desired results.

Providing answers to these fundamental research questions represents a contribution to management, economic theories, and administrative behaviour in public sector institutions. The answers that the present study aspires to provide will theoretically contribute to reaching a comprehensive and deeper understanding of the role of PSM in ethical behaviour and performance in public sector institutions, and it evaluates and clarifies how government managers can influence the ethical behaviour of their employees through the achievement of its various dimensions of PSM, and how PSM influence performance. This study has a practical contribution that is embodied in clarifying how general managers can manage the ethics and performance of their employees strategically, effectively, and efficiently through managing PSM in its various dimensions in their organizations.

### 1.3 PURPOSE OF THE STUDY

This dissertation aimed to investigate the influence of PSM with its studied dimensions [Attraction to Public Service (APS), Self-Sacrifice (SS), Compassion (COM), Commitment to Public Values (CPV)] on Jordanian hospital's ethical behaviour with its studied dimensions [Ethical behaviour of self (EBS), Ethical behaviour of co-workers (EBC), Ethical Leadership] and organizational performance. Knowing that the component of PSM in association with ethical behaviour in the Arabic countries and especially the Jordanian public sector context has not been researched previously, within the knowledge of the researcher. This study explored the impact of PSM on ethical behaviour using established measures of PSM (i.e., Kim et al., 2013) and Deshpande, Joseph & Prasad (2006); Yukl et al., (2013) for measuring ethical behaviour, by developing the original constructs to adopt the nature of Jordanian culture, which made us took a later step, by developing a study tool for each of the studied variables and developing them in line with the reality of the state of public hospitals in Jordan; as a gateway and a preliminary step for future researchers who want to study these variables in similar organizations in Jordan or the Arab world. On the other hand, this study tries to measure performance in the MoH

hospitals by applying a two-stage DEA model, using reported published data from MoH after taking the permission to use this data. With this aim in mind, in this dissertation, we present a new empirical framework for measuring the performance by using the aggregated survey data of PSM combined with a set of inputs and outputs from published reports and using PSM and its dimensions, via a two-stage DEA model, instead of using survey-based tools to measure organizational performance, which is an issue has been raised by many of the PSM pioneers (Petrovsky & Ritz, 2014). Another purpose of this dissertation was to construct a survey instrument specifically for JMoH hospitals responders from questionnaire items from prior literature (Kim *et al.*, 2013). Therefore, we construct a conceptual model for investigating the effect of PSM on ethical behaviour and performance. In the end, we sought to identify theoretical and practical implications of the findings and suggest directions for future research in the field.

#### **1.4 SIGNIFICANCE OF THE STUDY**

The significance of the dissertation can be divided twofold. First, is scientific significance, which is derived from theoretical and practical aspects contributions. The theoretical significance can be shown in the extension of the knowledge base. Where PSM, ethical behaviour, and organisational performance have been studied in many different cross-national studies, but it remains scarce in Arabic countries' contexts, so, this will deepen our understanding of these concepts in the Jordanian public sector, specifically the public health sector. However, this dissertation was theoretically significant because it applied research in an area that was wildly understudied in academia. We hope this dissertation will lay the foundation for similar future research by academic societies and associations related to healthcare institutions to clarify the prediction factors further and try to influence the motivation of public employees and how it may affect their ethics and performance. Furthermore, how to promote higher levels of PSM for MoH hospitals employees in the future. The current dissertation was an advancement in the knowledge base in PSM, ethical behaviour, and performance. Since PSM has been developing exponentially, not all aspects of the relation to ethical behaviour and performance had been

comprehensively researched, and the research on public health sector employees was especially important. The conclusive practical significance of this dissertation was its contribution to the motivation of MoH hospitals responders.

Secondly, the practical importance of this thesis comes from the importance of the application sector represented by the Jordanian public hospitals affiliated with the Jordanian Ministry of Health. Whereas, in light of the HKJ to improve and develop services and increase its efficiency, particularly the public health sector. At a time when HKJ faces significant challenges as a result of the unstable security conditions in the neighbouring countries, which has resulted in successive influxes of refugees hosted by Jordan in addition to the steady population growth, the typical transformation of the disease, and a high percentage of the elderly and youth (WHO,2019,p8). Hence, *The National Strategy for Health Sector in Jordan* report issued from World Health Organization (WHO) for the years between 2015-2019 pay attention to the need to consolidate the principle of medical ethics and to implement a performance-related motivation system with service providers, especially doctors, to provide high-quality, low-cost health services (WHO,2019,p29).

From our point of view, holistic knowledge of PSM and how it impacts the ethical behaviour and performance in the Jordanian public hospitals may make us understand the reasons that stand like a stick in the motivation enhancing wheel of the employees there, which in turn may affect their performance and ethical behaviour. Practically, this dissertation has potential implications for developing managers, engaging employees, and improving employee motivation, which will be reflected in hospitals, which will help improve service to the public and increase organisational performance. Therefore, these can serve to enhance and support positive ethical behaviour and organisational performance. Where it would be as a road map for the practitioners and decision-makers in the ministry.

## 1.5 THEORETICAL RATIONALITY AND HYPOTHESIS DEVELOPMENT

### 1.5.1 PSM and ethical behaviour

Perry (2000) had underlined that PSM inherited its theoretical foundations from a primarily rooted differentiated mass of research on the organisational motivation and values theory. In the last decades, research in and within the topic of ethics in public administration has been increased remarkably (Menzel, 2014). However, very few published studies have proven that PSM is one of the factors affecting ethical behaviour; among these studies are studies of (Meyer-Sahling, Mikkelsen & Schuster, 2019; Ripoll & Ballart 2019).

The definition of PSM, according to Perry and Wise (1990), is “*an individual's predisposition to respond to motivate grounded primarily or uniquely in public institutions and organisations.*” (p.117). This definition emphasizes the infusing of public values and norms with the idea that PSM originates in social structure, yet the outcomes of PSM should involve public values and norms (Ripoll & Ballart, 2020).

For instance, Maasschalck et al. (2008) argued that PSM and ethical behaviour share a lot of mutual values and moral bases by acting in a way that promotes public interests instead of self-interests by helping others for the better of their societies. Indeed, this behaviour of seeking public interests works as a moral compass for the workers within public organizations and motivates whether they are administrators or subordinates to think beyond their self-interest's desires in a more altruistic way (Crewson, 1997).

Accordingly, some of the first attempts by proactive researchers to prove the critical link relationship between PSM and ethics focused solely on whether PSM affects ethical/moral behaviour, justifying unethical behaviour and reflecting public values against a self-centred or self-interest driven behaviour (Kwon 2014; Maesschalck et al. 2008; Ripoll & Schott, 2020; Wright, Hassan, and Park 2016). On the other hand, most of the recent prior studies do not provide a clear vision for the linkage between PSM and ethical behaviour; hence, as a result of this blurriness in this part of the academia; the theoretical rationality into the links between the components (SS, COM, APS, CPV) of PSM and ethical behaviour still also blurry if wither PSM could really foster

or affect ethical behaviour of public workers (Meyer-Sahling, Mikkelsen & Schuster, 2019; Ripoll & Ballart 2019).

Nevertheless, these theoretical rationalities imply that PSM plausibly could deliver a link to ethical behaviour in specific and behaviour in general. Therefore, scholars and theorists stated that there is a necessity to do more empirical studies in the relationship between PSM and ethics to fill the gap between the realities and conceptual studies (Perry, 1996; Lim Choi, 2014; Menzel & Carson, 1999).

In an effort to contribute to our understanding, the expected empirical and theoretical outcomes from this study, that is, PSM have an impact on the ethical behaviour of public workers within the Jordanian public hospitals. Consonant with these expectations, we hypothesize: ***Hypothesis 1: Public service motivation has a positive statistically significant influence on ethical behaviour in the Jordanian public hospitals***

### **1.5.2 PSM and organizational performance**

It has been stated that PSM can heighten the level of performance within the public employees, and the most prevalent PSM in the organization; the more that the level of performance will increase (Ritz, 2014). But before further explaining the nature of the relationship between these two variables, the mechanisms behind this theoretical argument will be clarified first.

Need-base theory is one of the theories that helped to shape PSM, where it explains one of its forms when it comes to individuals' motivation, which encompassed two types of motivation (i) *intrinsic motivation* and (ii) *extrinsic motivation* (Perry et al. 2008). Intrinsic motivation is when the employee engages with tasks, job, and organizational goals because they found it rewarding, and they do the activity for their own sake, not for another desire or for expected rewards (Lee & Reeve, 2012). On the other hand, extrinsic motivation is when the behaviour is framed and guided by rewards scheduled in return, for instance, monetary incentives (Tranquillo & Stecker, 2016).

However, PSM is particularly considered as an intrinsic motivation as an employee focus on the significance, meaningful tasks, and enjoying the activities with focusing on public-interests and doing the

good for the people (Perry et al., 2010). Within this context, we understand that PSM is more important to enhancing and stimulating performance in public organizations than monetary incentives. Crewson (1997) puts forward the view that intrinsic motivation is important for the workers in public organizations, more than those in private organizations and vice versa. Likewise, Wright (2007) reaches the same conclusion as Crewson.

Previous empirical research on the relationship between PSM and performance occasionally prove an existence moderate positive relationship between the two variables, but certain evidence remains vague, and the results are still inconclusive or inconsistent (Kim, 2005; Belle, 2013; Park and Rainey, 2008; Hondeghem and Perry, 2009; Pratama & Nurhidayah (2019).

Nevertheless, Brewer (2008) synthesized the studies that investigated the relationship between PSM and performance, and he found that a minimal number of studies that explore the relationship between PSM and organizational performance, especially in public administration organization, which emphasize the idea that we still without certain evidence in the nature of this relationship (Zhu & Wu, 2016)

For instance, Belle (2013), in her experimental study design, tried to assess whether is motivation play a role in influencing the performance of public workers in Italian public hospitals. Where she found that motivation influence the performance of the public health sector in Italy. Meanwhile, Pratama & Nurhidayah (2019) studied the impact of PSM on the public workers' performance and commitment to *Magelang Municipality-Indonesia*. The results using SEM indicates that PSM had a positive influence on public workers' performance and commitment.

Public performance measurement, motivation, and micro-management are considered one of the main issues in the public administration academia, and many scholars and practitioners recommend other researchers to address it (Behn, 1995; Zhu & Wu, 2016). It has been argued by (Perry & Wise, 1990; Rainey and Steinbauer, 1999; Kim, 2005) that PSM is a good predictor of organizational performance within the context of public organizations,

but the main problematic issue contained by this argument is the difficulty to measure this impact on the organizational level on meaningful way.

Incidentally, measuring performance objectively is very rare and considered a challenge and especially in public administration due to the multifaceted nature of public service performance and the different factors that influence it (Andrews et al., 2005). Along similar lines, Ritz (2009) argues that performance as an outcome in public administration organizations is tremendously difficult to measure for the reason that performance indicators lack sufficient and reliable data.

Few other scholars (e.g., Andrews et al. 2006; Alreshoodi, 2019) attributed this problem to the difficulty of applying standard performance metrics throughout public organizations, where it is very hard to quantify performance goals, efficiency, and effectiveness in public organizations, unlike private organizations, especially when these goals are part of a plural society with multiple players that have different subjective performances criteriums.

To understand the concept of the organizational performance measurement process, we have first to know the origin of rationality behind it. Gębczyńska & Brajer-Marczak (2020) pointed out that the reasoning behind the organizational performance measurements branches from the "General Theory" by Weiner (1948, 2019) and Bertalanffy (1968). Furthermore, Neely et al. (2000) stated that "*a performance measure is a metric used to quantify the efficiency and/or effectiveness of action.*"

Indeed, the expansion of using multiple quantitative methods in economic and administrative sciences (public administration) drove us to enhance and improve the efficiency of public sector activities (Buleca & Mura, 2014).

In order to develop a method, the decision-making process in public administration should be taken into consideration, and how to evaluate and assess the effectiveness of this method (Ochrana, 2004). The following table (Table 1-1) demonstrates the classification of performance quantification and effectiveness assessment techniques by one of the pioneers in public administration in Europe, Prof. Ochrana.



**Table 1-1: Possible techniques of performance quantification**

<b>Type of the technique</b>	<b>Name of the technique</b>
Input-output methods	cost minimization analysis cost-benefit analysis cost-effectiveness analysis cost-utility analysis
Methods of financial analysis	net present value pay back method internal rate of return
Decision making supporting methods	Methods of managerial science: - calculation of critical path method - linear programming - dynamic programming
Methods of evaluation and comparison of performance and quality/services	benchmarking (comparison studies) balanced scorecard ISO

*Source: own production based on Ochrana (2004)*

Besides, the nature of performance measurement systems doesn't consider universal, where the choice of the measurement system depends primarily on the organization's nature and type. However, the metrics that have been adopted in health sector organizations differ from the organizations in ministries, local government institutes, higher education, where the organizational conditions, cultural, and national conditions play a very vital role in choosing the appropriate performance metrics system (Gębczyńska & Brajer-Marczak, 2020).

Performance indicators differ between self-reported, internal efficiency, and self-reported performance ratings by administrators (Naff & Crum 1999). Where Self-reported measures are criticized for the reason that they are subjected to social desirability and common source bias, which may potentially cause several false positives (Palma et al., 2021).

In short, organizational performance measurements are very complex by nature and depend on several factors and variables that play a part in the whole process, not to mention the legitimacy of the process also (Boyne et al., 2006). Given the nature of this complexity imperative a margin of development in the sphere of organizational performance measurement, and it will address as follow. In this study, we introduced a new methodological approach that can measure the effect of PSM on the performance of Jordanian public hospitals using a two-stage DEA, where the public administration meets economics. With this regard, DEA considers one of the most appropriate techniques to quantify public administration performance by evaluating the efficiency via estimating technical efficiency for DMUs based on a set of inputs and outputs (Ogawa & Tanahashi, 2008). Also, it proved to help public officials, decision-makers, and practitioners make decisions and rationalize public administration (Ryan, 1994).

Based on the abovementioned debate and theoretical linkage, we understand that the previous studies offer no sharp conclusions about the direct effect of PSM on organizational performance in general and in Jordan especially. Moreover, there is no agreement between the scholars on the best way to estimate organizational performance in public administration organizations, which addresses one of the most important tools and research gaps that this study seeks to fill by using DEA as a measurement for the organizational performance of the Jordanian public hospitals and how PSM can estimate the organizational performance using two-stage DEA

Hence, this study agrees with the results of some previous studies (e.g., Kim, 2005; Perry and Wise, 1990; Zhu & Wu, 2016) that PSM could lead to increased organizational performance for public administration workers, where researchers propose the following proposition:

***Hypothesis 2: Public service motivation has a positive statistically significant influence on organizational performance in the Jordanian public hospitals***

## 1.6 RESEARCH HYPOTHESIS

Hypotheses following, drawn from the problem statement, theoretical rationality and research questions presented above, where this study expects that ethical behaviour and performance can explain variances in PSM. Therefore, we assume that the variance of the effect of PSM can be explained by the variance in ethical behaviour in the Jordanian public hospitals. Last, of all, we assume that public service motivation has a statistically significant effect on organizational performance in the Jordanian public hospitals using a two-stage DEA. Consequently, based upon the discussion on PSM and ethical behaviour this study's anticipations can be stated as follows:

**H<sub>1.0</sub>: *Public service motivation has a positive statistically significant influence on ethical behaviour in Jordanian public hospitals.***

**Twelve sub-hypotheses are split from the main hypothesis:**

**H<sub>1.1</sub>: *Attraction to Public Service has a positive statistically significant influence on Ethical Behavior in the Jordanian public hospitals.***

**H<sub>1.1.1</sub>: *Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals.***

**H<sub>1.1.2</sub>: *Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Co-workers in the Jordanian public hospitals.***

**H<sub>1.1.3</sub>: *Attraction to Public Service has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals.***

**H<sub>1.2</sub>: *Self-Sacrifice has a positive statistically significant influence on Ethical Behavior in the Jordanian public hospitals.***

**H<sub>1.2.1</sub>: *Self-Sacrifice* has a positive statistically significant influence on *Ethical Behavior of Self* in the Jordanian public hospitals.**

**H<sub>1.2.2</sub>: *Self-Sacrifice* has a positive statistically significant influence on *Ethical Behavior of Co-workers* in the Jordanian public hospitals.**

**H<sub>1.2.3</sub>: *Self-Sacrifice* has a positive statistically significant influence on *Ethical Leadership* in the Jordanian public hospitals**

**H<sub>1.3</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Behavior* in the Jordanian public hospitals.**

**H<sub>1.3.1</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Behavior of Self* in the Jordanian public hospitals**

**H<sub>1.3.2</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Behavior of Co-workers* in the Jordanian public hospitals**

**H<sub>1.3.3</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Leadership* in the Jordanian public hospitals**

**H<sub>1.4</sub>: *Compassion* has a positive statistically significant influence on *Ethical Behavior* in the Jordanian public hospitals**

**H<sub>1.4.1</sub>: *Compassion* has a positive statistically significant influence on *Ethical Behavior of Self* in the Jordanian public hospitals**

**H<sub>1.4.2</sub>: *Compassion* has a positive statistically significant influence on *Ethical Behavior of Co-workers* in the Jordanian public hospitals**

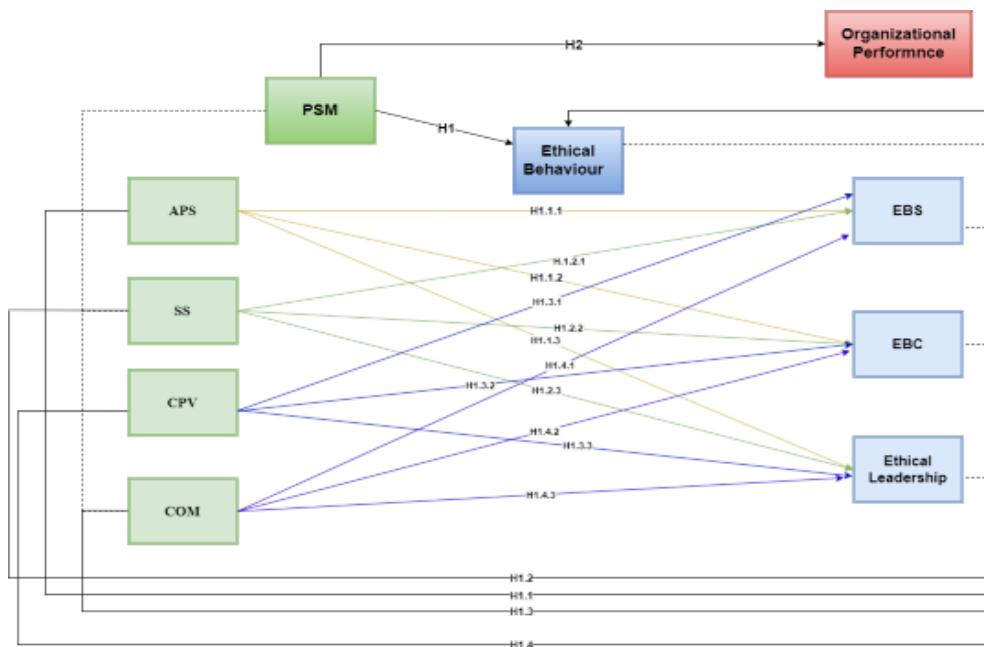
**H<sub>1.4.3</sub>: Compassion has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals**

**H<sub>2.0</sub>: Public service motivation has a positive statistically significant influence on organizational performance in the Jordanian public hospitals**

### 1.6 CONCEPTUAL MODEL

The next diagram represents the conceptual model that this thesis develops, where it shows the study hypothesis and its orientation to simplify the initial framework to outline the course of action within the thesis.

Figure 1-1: Conceptual Model



Source: own production

## **1.7 RESEARCH DELIMITATIONS**

### **1.7.1 Purpose Scope**

These theses had two main purposes:

1. Explore the effect of PSM on ethical behaviour.
2. Explore the effect of PSM on performance using two-stage DEA.

### **1.7.2 Time Scope**

The time scope for this study is determined by 2019-2020 for the first part of the thesis (PSM and ethical behaviour). Which is the year that study data has been collected, and 2019-2021 secondary data for the second part of the thesis concerning (PSM and performance).

### **1.7.3 Location Scope**

The location scope is represented in the Hashemite Kingdom of Jordan and its governorates, in which public hospitals are distributed.

### **1.7.4 Population Scope**

The population of this dissertation is from Jordanian Ministry of Health employees with an approximate number = 58,000. However, the Ministry of Health includes 27 hospitals, which contain 26,000 employees.

## **1.8 RESEARCH ETHICS**

Owing to the sensitive nature of the dissertation subject which involved a survey of the workers of Jordanian public hospitals and the published data from the Ministry of Health (MoH) in Jordan, we took great care in preserving the confidentiality of the respondents' information. Thus, participation in the study was completely voluntary. However, ethical approval has been taken from the ethical committee of the Jordanian MoH to collect and use the data for pure research purposes only, where all ethical forms and letters have been taken into consideration – Appendix 1.

### 1.9 COUNTRY PROFILE

The Hashemite Kingdom of Jordan (HKJ) is an Arab Muslim country, located in the north of the Arabian Peninsula and in Western Asia. It is bordered by Iraq to the east, Syria to the north, Saudi Arabia to the south and southeast, and Palestine (the West Bank) to the west. It is called Jordan in relation to the Jordan River, which passes on its western borders, and the capital is Amman ([USAID, 2018](#); [Country Handbook Program, 2019](#)).

Some people settled in Jordan around 50,000 BC, but the actual history of the country goes back to the Bronze Age period - that is, the period between 3200-1950 BC - until the Iron Age. Several Jordanian regions have been mentioned in religious writings since 597 BC, such as Moab and Gilead, and it is worth noting that Alexander the Great ruled large areas, including Jordan, and had a great impact on their development and development, and the establishment of special centres for trade, then in the period between the 2-4 centuries BC Greece ruled the region, and contributed to building civilization and the education system, as cities such as Philadelphia and a wall were built during their reign, as scholars and thinkers appeared at that time. As for the Islamic rule, it entered Jordan in the period after 661 AD and continued until the advent of the Ottoman Empire, which ruled the region from the fifteenth century AD until 1918 AD, and then in On May 25, 1946, Jordan declared its independence ([USAID, 2018](#)).

Amman is the capital of Jordan and its commercial, administrative, economic, and educational centre. It is the largest of the country's governorates in terms of population, and the third-largest in terms of area, preceded by the governorates of Ma'am and Mafraq. The most important institutions of the Jordanian state are located in Amman, in addition to all departments The city of Amman is located in the middle of the Kingdom, and it rises about 750 meters above sea level, and mountains are spread in it, as the areas of the capital are spread over 20 mountains. After on the slopes and peaks of the mountains, due to the narrowness of the area due to the increase in population numbers ([Ministry of interior, 2019](#)).

The total length of Jordan's land borders is about 1,635 km, of which it shares a length of 744 km with Saudi Arabia, and 375 km with

Syria, 181 km with Iraq, and 335 km with Palestine, while the length of its maritime borders is about 26 km. From an astronomical point of view, Jordan is located at the intersection of latitude 31 degrees north with a longitude 36 degrees east, and the total area of the country is approximately 89,342 km<sup>2</sup>. The land covers an area of 88,802 km<sup>2</sup>, while water covers an area of 540 km<sup>2</sup> ([The World Factbook, 2021](#)).

The population of Jordan for the year 2020 AD is estimated at 10,211,277 people, which constitutes approximately 0.13% of the total population of the world, and Jordan is ranked 88th in the world in terms of population, and the population density in it reaches about 115 people / km<sup>2</sup> and is concentrated in the centre and north of the country 91.5% of the total population is urban, and it is worth noting that Arabs constitute the majority of Jordan's population, at a rate of 98%, while Circassians and Armenians constitute only 1% of the population. As for languages and religions in the country, the official language is Arabic, the first foreign language is English, and Islam is the official religion in Jordan, as Muslims constitute 92% of the population, while the Druze constitute 2%, and Christians are 6% ([Worldometers, 2022](#)). The system of government in Jordan is considered a hereditary monarchy, headed by the King, who protects the constitution and holds the position of supreme commander of the armed forces. The Jordanian political system is divided into three authorities ([Country Handbook Program, 2019](#); [Jordan Custom, 2019](#)):

1. The Executive Authority: It is represented by the government-appointed by the King, and it exercises its powers through the Council of Ministers and government officials.
2. The Legislative Authority: It is concerned with issuing legislation and holding the government accountable. It is represented by the House of Representatives and the Senate.
3. The Judicial Authority: It is an independent authority that assumes the function of achieving justice among citizens and protecting their rights.

Jordan consists of 12 governorates, each of which is divided into several districts, districts, municipalities, cities, and villages. The mayors of villages and cities are appointed by the king and councils that



are partly elected, but most of the local authorities come directly from the king, while the supervision of local projects by the administration of each district, which operates according to the directives of the national government ([Country Handbook Program, 2019](#)).

Despite the problems it encounters and the fact that it is a small country, Jordan's economy is well-diversified. The commerce and financial industries account for roughly a third of GDP, while the transportation, communications, public utilities, and construction sectors account for a fifth of the GDP, which is the same value to which the industrial and mining sector contributes ([Abu Jaber, 2022](#)). The main source of foreign currency in Jordan is the remittances coming from Jordanians working abroad. It should be noted that the official currency in the country is the Jordanian dinar, which is available in the form of paper denominations, which are: 50 dinars, 20 dinars, 10 dinars, 5 dinars, one dinar, and metal denominations: half a dinar, a quarter of a dinar, 100 fils, 50 fils, 25 fils, 10 fils, and 5 fils, where one Jordanian dinar equals 1,000 fils, or 100 piasters ([The Official Site of the Jordanian E-Government, 2022](#)).

## **1.10 BIBLIOMETRIC ANALYSIS**

### **1.10.1 Prologue**

Bibliometric analysis is an analysis that uses a set of statistical and mathematical methods to analyse the data related to many – if not all types of documents (e.g., academic papers, scientific articles, dissertations, books, reports, conference papers, etc.) to know the characteristics of information circulation processes ([Rey-Martí et al., 2016](#)). Moreover, to assess the qualitative and quantitative changes in a specific research topic, hence, showing the trends, evolution, emerging ideas, geographical characteristics, and citation information for this topic within a specific discipline ([De Bakker et al., 2005](#); [Vogel & Masal, 2015](#)).

### **1.10.2 Bibliometric Analysis Method**

In this part of the study, the content analysis method was used in general, bibliometric method and in particular. Bibliometric methods

have been started in the sixties (Pritchard, 1969), and it is still used until now, with great interest; to quantitatively crystallise and give an overview for research in a field. Where this dissertation research will focus on this part only on the explanatory variable, which is PSM in this study. Since the seminal work of Perry and Wise (1990) on PSM, the topic has exponential interest from researchers and has taken widespread, where it has been studied in many countries, cultures, and different sectors (Ritz et al., 2016). With emphasising the remarkable growth of international research (Kim et al., 2013). Regardless of this interest in the topic of PSM, still, some scientific gaps exist that require backfilling (Marques, 2021). However, this analysis aimed to show the development of the PSM and explore the geographical characteristics, and the variables related to it. In order to analyse the data, we used the R program package (Biblioshiny) and VOSviewer software version 1.6.18 to handle the analysis.

### **1.10.3 Sample and unit of analysis**

This study uses the Scopus online database, which contains scientific documents across all disciplines. In fact, those databases provide an easy extraction process for bibliographic data (i.e., descriptive data, collaborations, affiliations, citations) for researchers to do such analysis. It is a well-known fact that the coverage of the Scopus database is the best for social sciences (such as political science, psychology, economics, anthropology, business, arts, and public administration) and humanities domains and relatively poor coverage in some other natural, medical, and life sciences (Moed, 2006; Van Leeuwen, 2013). Giving the fact of the sensitivity of this type of analysis to the keywords, we used the most important and related keywords with the study framework and variables, where the search syntax is as appears in Annexure 1. However, the next table shows the descriptive data for the bibliometric analysis study.

Table 1-2: Bibliometric analysis summary

Description	Results
<b>Main Information About Data</b>	
Timespan	2000:2021
Sources (Journals, Books, etc)	91
Documents	307
Average years from publication	4.2
Average citations per document	21.58
Average citations per year per doc	2.901
References	15727
<b>Document Types</b>	
Article/s	307
<b>Document Contents</b>	
Keywords Plus (ID)	281
Author's Keywords (DE)	682
<b>Authors</b>	
Authors	487
Author Appearances	714
Authors of single-authored documents	66
Authors of multi-authored documents	421
<b>Authors Collaboration</b>	
Single-authored documents	97
Documents per Author	0.63
Authors per Document	1.59
Co-Authors per Documents	2.33
Collaboration Index	2

*Note: descriptive outputs of the bibliometric analysis using R program via (Biblioshiny) package.*

It could be noticed from the previous table that we took a time scope between 2000-2021 in order to have a wide range of results, to detect the emergence of the phenomena within a decade of time and catch the historical interest of the topic during this time. It is also shown that the average number of years from publication was 4.2, which is

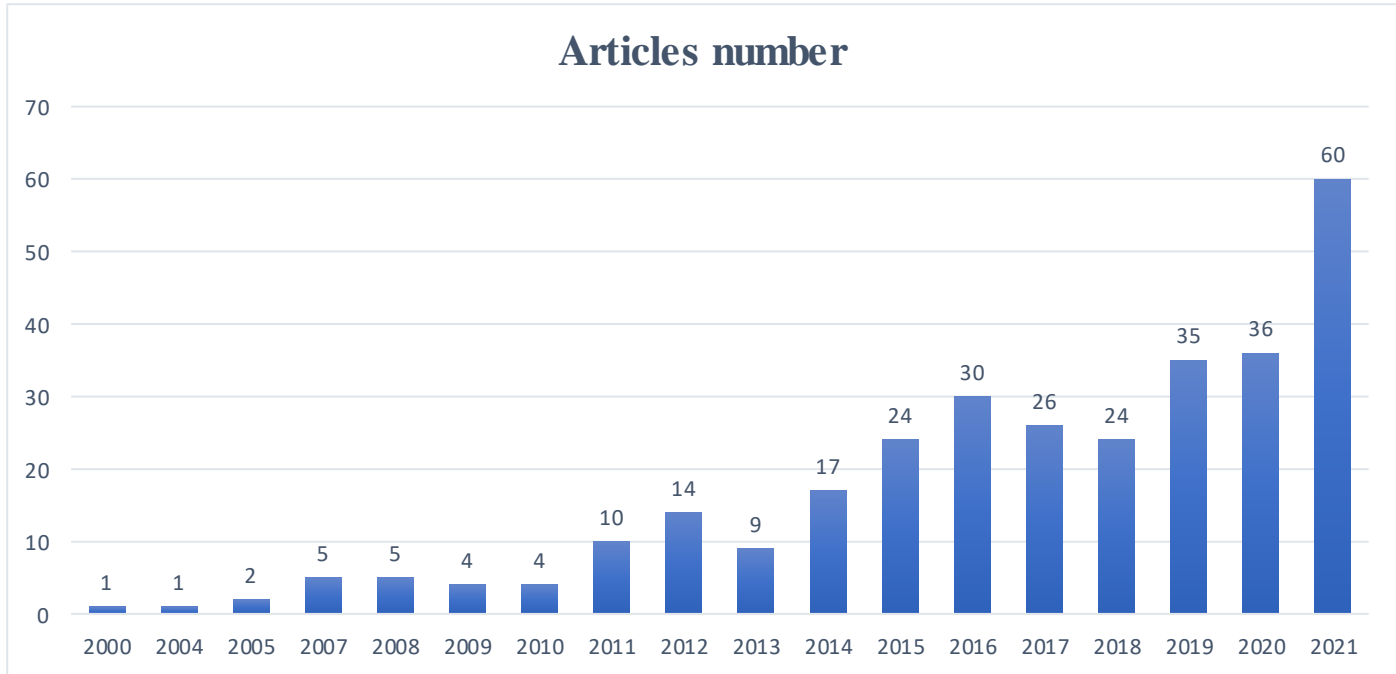
calculated considering the number of citations obtained by a journal in the current year to the documents published in the four previous years, (i.e., citations received in year Y to documents published in years Y-1, Y-2, Y-3, and Y-4; [Scopus, 2022](#)). Moreover, the unit of analysis in this part of the study was articles with a total number of (n=307), using the bibliometric indicators of language, areas of knowledge, disciplines, countries, etc. Nevertheless, the number of authors in this sample was 487 authors, with 66 authors of single-authored documents, and 421 authors of multi-authored documents.

The first search results returned a total of 307 articles, published between the period (January 2000 – December 2021) on the topic of “public service motivation”, “ethical behaviour” and “performance/organizational performance” in the public health sector simultaneously, within the categories of social sciences -public administration - (167), psychology (49), economics (38), health studies (31), and humanities and art (22). In light of these results, it can be noticed that there is a remarkable weight for the research area of social sciences -public administration - (167, 54.39%) and in the least is humanities and art (22, 7.166%).

### **1.10.3.1 Year of publication**

The results of annual production frequency analysis show that the number of articles published per year between 2000 and 2010 is very low as is shown in Figure 2. Indeed, the results show an increase of interest in this area of knowledge starting from 2014. Nevertheless, the number of publications has increased annually. Where From 2014 to 2021, the number of publications increases gradually, with a higher number of publications in the year 2021 with a total of (60) articles.

Figure 1-2: Public Service Motivation Annual Scientific Production

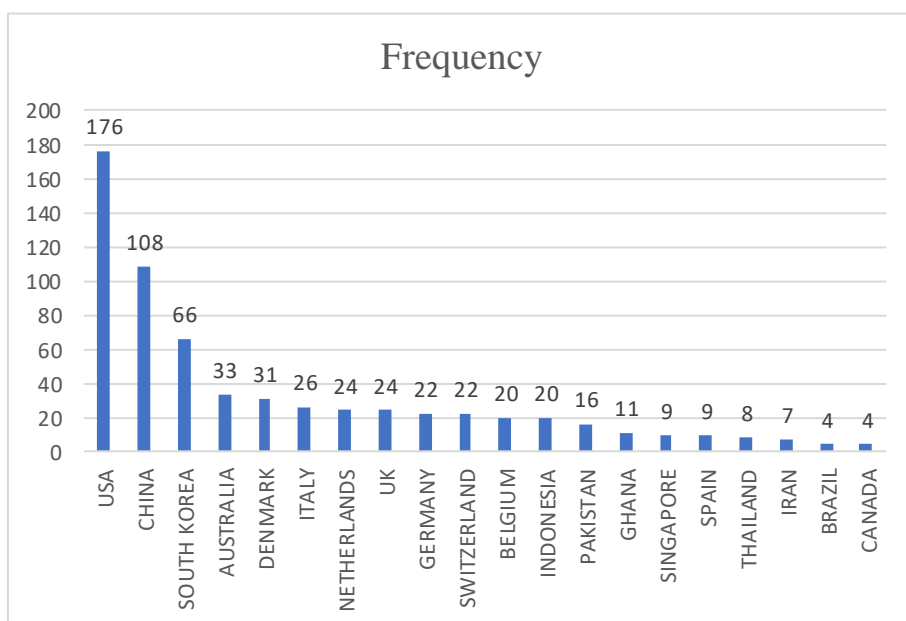


*Note: our production based on the bibliometric analysis results from Scopus*

### 1.10.3.2 Country Citation frequency

Figure 1-3 shows that the USA had the biggest share of the citation with 176 cited articles. China ranked second with 108 articles, followed by South Korea with 66 articles. Following South Korea, Australia and Denmark came after with very similar results Australia (31), and Denmark (30). However, the countries with the least cited articles were Canada (4), Brazil (4), Iran (7), Thailand (8), Spain (9) and Singapore (9). The absence of the Arabic production presence in general and the Jordanian presence, in particular, confirms the gap that we touched on, in the problem of the study and the need to conduct these types of research in different contexts, one of which is the Middle East.

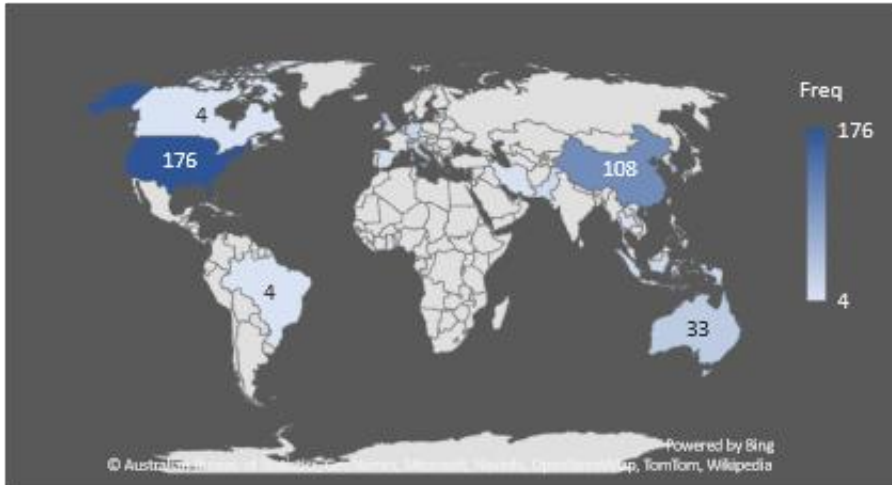
Figure 1-3: Frequency of citations by country



Source: our production using the bibliometric analysis results from Scopus

Furthermore, for a more visual representation of the previous frequency analysis, we used a heat map (Density Map) to easily navigate the results based on the continents.

Figure 1-4: Country Citation Map

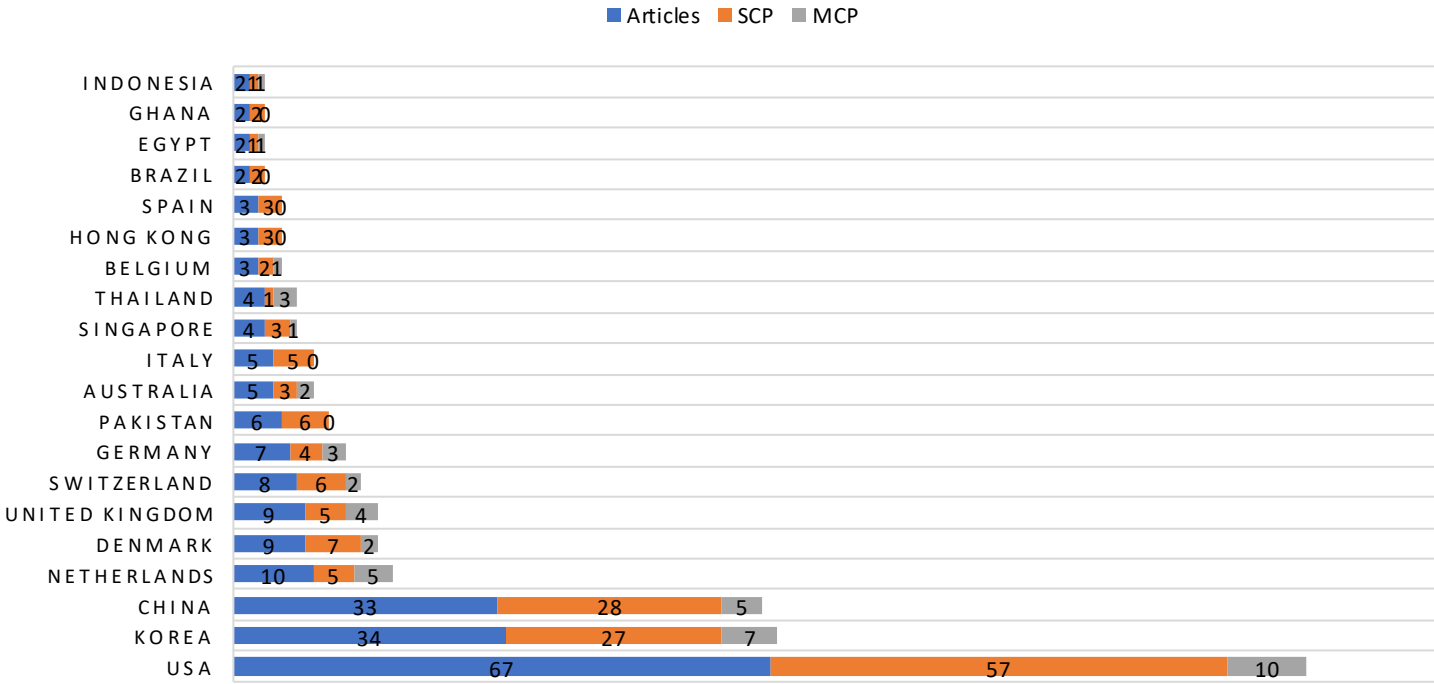


Source: our production using the bibliometric analysis results from Scopus

### 1.10.3.3 Corresponding Author's Country and collaborations

The following figure (Figure 1-5) indicates PSM studies collaborations are significantly scarce in the middle east and Africa. On the other hand, Single Country Publication (SCP), Multiple Country Publication (MCP) were highly considered in the USA (67), Korea (34), China (33) as the top three countries. Indicating that those three countries demonstrated a strong preference for international cooperation regarding PSM, ethics, and performance in public health organizations. On the other hand, the least countries with the lowest collaborations were Indonesia, Ghana, and Egypt with two collaborations.

Figure 1-5: Corresponding Authors by Country



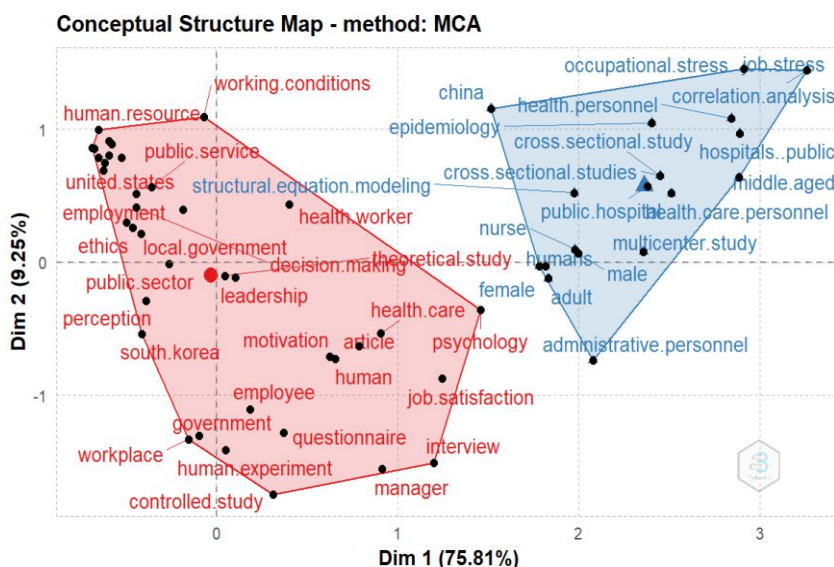
Note: Single Country Publication (SCP), Multiple Country Publication (MCP)



### 1.10.3.4 Cluster analysis

Cluster analysis via Multiple Correspondence Analysis (MCA) has been performed in terms of the study sample of all articles indexed keywords. However, Figure 1-6 shows the conceptual structure map of the keywords associated with articles in the sample of this part of the study. In this analysis, a two to three-dimensional graph is based on the compressed data; to detect the similarity between the keywords using Point-Plane Distance or what is called P-Point (P Ms et al., 2021). Nevertheless, any keywords close to the centre are reflecting the growing interest they received during these years (Xie et al., 2020).

Figure 1-6: Factorial analysis of conceptual structure map-method using high-frequency keywords



Source: bibliometric analysis using R program via (Biblioshiny) package.

The results in Figure 1-6 are interpreted based on the relative positions of the high-frequency points - keywords - concerning the dimensions, taking into consideration the distributions of the points, the



more similar keywords, the more they represented in the map (Aria & Cuccurullo, 2017). It is clear from Figure 5 that there are two clusters, namely, Cluster 1 with red colour contains 40 points the most important of which depending on the rule of (Xie et al., 2020) and the aim of this analysis are *job satisfaction, healthcare, motivation, leadership, decision making, health workers*. The second cluster (Cluster 2) with blue colour has 17 points, where the most important keywords within it are *public hospitals, health care, nurse, cross-sectional studies, structural equation modelling*.

### 1.10.3.5 Social network analysis

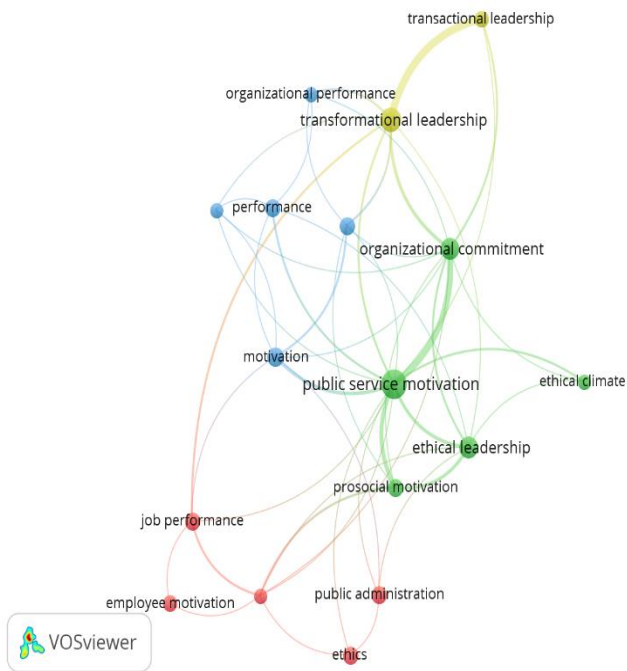
Within the same context of the previous analysis in section 1.10.3.4, researchers utilize co-occurrence analysis using *VOSviewer* by taking only the keywords of authors, in order to reveal the connections between themes. However, the frequency of the keywords within this analysis is reflected in the size of the node, the higher the frequency, the bigger the node. Also, the lines that are connected with the nodes reflect the strength of the relationship, where the stronger is the connection the thickness of the line, and as result, the stronger the relationship between those words (Chen, et al., 2016).

The results as is shown in Figure 6 it has 18 items with ( 5 clusters ) as follows: cluster 1(5 items) employee motivation, ethics, intrinsic motivation, job performance, public administration; Cluster 2 (5 items) ethical climate, ethical leadership, organizational commitment, prosocial motivation, public service motivation; Cluster 3 ( 5 items ) emotional intelligence, motivation, organizational performance, performance, performance management; Cluster 4 (2 items) transactional leadership, transformational leadership; Cluster 5 (1 item) public service.

The public service motivation node was the strongest among the other nodes followed by organizational commitment and ethical leadership as shown in Figure 1-7. Alternatively, transactional leadership, and performance, were the weakest. The closest of these relationships from our independent variable here (i.e., PSM) are organizational commitment, ethical leadership, prosocial motivation, and ethical climate. Ethics, performance, organizational performance,

transactional leadership, and employee motivation were the furthest, where we attributed this to the emergence of studying those variables in contrast to the keywords widely discussed in the literature, which increases the need to study these concepts.

Figure 1-6: Authors' keywords co-occurrence analysis of articles

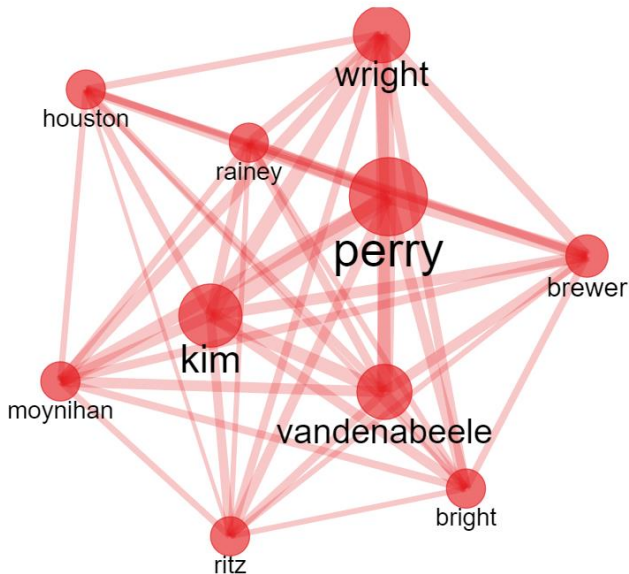


Source: our analysis using VOSviewer software

### 1.10.3.6 Prominent Authors

The following figure represents the prominent authors that help to shape the concept and theory of PSM, where the concept of PSM was formalized by several scholars, such as Porter, Rainey, and Buchanan; but it was coined officially by Perry 1990 (Perry & Wise, 1990). However, during the last decade, many researchers help to increase our understanding of the concept of PSM internationally. However, in this part of the study, we carried out another social network map, with co-authorship bibliometric analysis for the most prominent authors for the last decade as shown in Figure 1-8. The network shows that Perry is the most prominent author depending on the size of the node. Followed by Kim, Wright, Vandenabeele, and finally Brewer, Rainey, Ritz, Houston, Moynihan, and Bright.

Figure 1-8: Authors' keywords co-occurrence analysis of articles



Source: our analysis using R program via (Biblioshiny) package



## CHAPTER II: REVIEW OF THE LITERATURE

### 2.0 THEORETICAL FRAMEWORK, LITERATURE REVIEW, AND PREVIOUS STUDIES

The second chapter of this PhD dissertation consists of three main parts, namely: (1) the theoretical framework of the study; (2) a literature review; and (3) previous studies relevant to each variable. The main variables are also three in number: Public Service Motivation, ethical behaviour, and organizational performance. Each part of this chapter consists of a number of interconnected sub-sections. In the following section, we discuss PSM as a theory, including its definition, its importance, and the factors affecting it and any persons involved.

#### Prologue

Among the essential roles and responsibilities that managers take upon themselves are to direct and arouse the enthusiasm of their employees' to perform the tasks assigned to them in the best and most effective way. Here we refer to the concept of *motivation* that drives an individual to undertake a specific action with perseverance and effort. What enhances the enthusiasm of individuals to work is the ability of the organization's management to employ appropriate motivation systems that are in line with the nature of the work and workers, whether individuals or groups.

Therefore, the most successful organizations are those that can sharpen the energies of their employees to the highest degree and direct those energies to attain organizational goals. In this section, the researcher begins by explaining the concept and basics of motivation, then reviews the most significant theories on motivation.

## 2.1 PUBLIC SERVICE MOTIVATION THEORY

The theoretical rationale of this study is shaped by the theory of Public Service Motivation (PSM) of [Perry and Wise \(1990\)](#). As a result of the failure of public administration following widespread critique, reproach, and reform of public services in the United States in the 1970s, as well as the absence of merit pay in public administration at that time, [Perry and Wise \(1990\)](#) established a formal motivational theory that sought to decipher the relevant concepts and philosophy of what motivates public officials. This theory was known as Public Service Motivation, later developed by [Perry, Hondeghem and Wise \(2010\)](#) to explain the ethos of public sector workers.

It should be clarified that classical motivational theories were the basis of establishing the theory of PSM. Where motivation was first considered as a general theory ([Behn, 1995](#)), PSM was a more particular theory derived from classical theories ([Perry & Hondeghem, 2008](#)). In this regard, [Perry \(2000\)](#) contended in his paper “*Bringing society in: Toward a theory of public-service motivation*” that even if classical motivational theories were the source of PSM theory, the core of his effort was built upon criticism of those earlier theories.

In a deeper examination, [Shamir \(1991\)](#) criticized motivational theories as a whole. Nonetheless, his critiques were the starting point for Perry to emphasize his alternative formal motivational theory. In his extensive work, Shamir identified biases and quickly arrived at biases in motivational theories, which he identified in a set of categories. The first was the “Individualistic Bias,” where individuals tend to be rational maximizers and follow the neoclassical paradigm asserted in economics and psychology ([Shamir, 1991](#)).

Another bias in motivational theory was termed by [Shamir \(1991\)](#) the “Fundamental Situational Bias” (or “strong situation bias”). This expresses the limitations in cognitive motivation theories, as Shamir argued that most of the motivational theories assume:

*“the importance of clear and specific goals and of reward-performance expectancies for individual motivation”* ([Shamir, 1991](#)).

Incidentally, psychology and organizational behaviour are largely considered the bases for almost all motivational theories (Frese *et al.*, 2001), emphasizing “*individualistic-hedonistic assumptions*.”

In consonance with Leonard *et al.* (1999) and Shamir (1991), classical motivational theories connected firmly with “*strong situation bias*,” where individuals tend to be hedonistic, utilitarian, and very vulnerable to external motivators, maximizing their organizational rewards and having an obvious goal. This would seem to be scarcely found in public organization environments (Perry & Porter, 1982) or in cultures characterized by power and low separation (Hofstede, 1980).

Moreover, the limitation of this motivational model is that it fails to focus on the motivational behaviour in “*weak level situations*” in atomized public organizations Leonard *et al.* (1999). In the following sections, the researcher will review the most prominent classical motivational theories that helped to shape the theory of PSM.

Furthermore, another important reason for the drive to develop this theory, and for the great interest in the subject by public administration theorists and scholars, was that it attempted to respond to and address the rational choice viewpoints of bureaucratic behaviour, which assume the existence of a rational agent with a self-interested desire for personal benefits (such as influence, reputation, and financial rewards). Incidentally, Vandenabeele (2007) explains how rational choice theories leave no room for studying the theory of PSM and how it can influence public service workers.

What distinguishes this theory from others is that it focuses on motives within the framework of public service, although it can be applied in different contexts such as business administration and non-profit organizations (Brewer & Selden, 1998); this was the first theory focused on the motives of employees in government organizations (Ritz, Neumann & Vandenabeele, 2016).

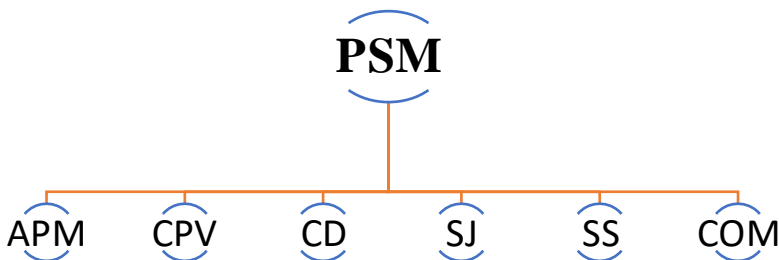
What makes this theory even more unique, according to Ritz, Neumann & Vandenabeele (2016), is that the theory of PSM is related to two theoretical perspectives: (1) the “*logic of consequentiality*” derived from Institutional Theory, and (2) the “*logic of appropriateness*” resulting from Rational Choice Theory.



Several scholars (e.g., Ritz, Neumann & Vandenabeele, 2016; Wang, van Witteloostuijn & Heine, 2020; Andersen, Jensen & Kjeldsen, 2021) have contended that the theory of PSM fits very well with the “logic of appropriateness” in Rational Choice Theory, where self-interest is the dominant behaviour; instead, behaviours and actions of workers are polished and driven by an appropriate code of conduct inherent in the organization in which they work (Olsen & March, 1989), which makes the theory of PSM a solution or treatment for the problem of the “logic of appropriateness” in Institutional Theory by implying the “logic of consequentiality.” Indeed, under the “logic of consequentiality,” the workers ask themselves systematic anticipatory questions before they act, such as the following: (1) What is the alternative?; (2) What are my values?; (3) What are the consequences of choosing my values?; and (4) Should I choose the alternative that is expected to achieve the best outcomes? (Olsen & March, 2004).

In the first instance, when developing the theory of PSM, Perry argued that public organizations workers/employees tend to work in public organizations because they have the following tendencies: (1) attraction to policymaking (APM); (2) commitment to the public interest (CPI); (3) civic duty (CD); (4) social justice (SJ); (5) self-sacrifice (SS); and (6) compassion (COM) (Perry and Wise, 1996). The following figure (Figure 2-1) demonstrates the characteristics introduced by (Perry and Wise, 1996) for PSM.

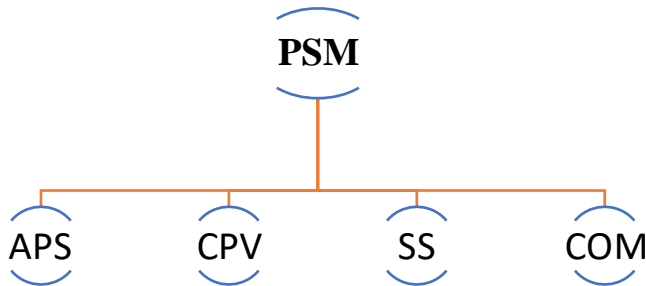
Figure 2-1: Perry and Wise’s initial PSM tendencies



*Source: own design based on Perry and Wise (1996)*

However, after initial construction of the components of the PSM concept, much debate ensued (see [Giauque, Ritz, Varone, Anderfuhren-Biget & Waldner \(2011\)](#); [Kim & Vandenabeele \(2010\)](#); [Kim \(2012, 2013\)](#)). This led to a general consensus on amending these components to include the following variables: (1) attraction to public service/participation; (2) commitment to the public interest/civic duty (CD); (3) compassion; and (4) self-sacrifice, while excluding the dimension of social justice found in the original construct. This is illustrated in the following figure.

Figure 2-2: PSM variables after eliminating SJ



Source: own design

Nevertheless, this new theory was not immune to criticism from scholars ([Alonso & Lewis, 2001](#); [Gabris & Simo, 1995](#)), where the major critique was in the idea that the theory had few direct test studies, and most studies on the realm of PSM focused on refining the scale. However, research on this topic has increased dramatically over the past 30 years ([Ritz et al., 2016](#)), and after more than 100 studies in over 20 countries, in many different contexts and considering relations with many other variables, these criticisms were largely refuted ([Perry, 2011](#)). In light of the results of those studies, PSM appears to have an influence on the willingness of public employees to stay in public organizations. Moreover, Perry stated that PSM influences ethical behaviour by manifesting such behaviour in social and organizational contexts ([Perry, 2011](#)), and this conclusion is supported by [Houston & Kim \(2006\)](#). On the other hand, there is no clear-cut evidence on the

influence of PSM on performance and person-to-organization fit (Perry, 2011).

It has been agreed by some researchers (i.e., Kim & Vandenberg, 2010; Kim, 2016) that the theory of PSM is underpinned by three separate types of motives, namely: (i) instrumental; (ii) identification; and (iii) value-based, with emphasis on the fact that self-sacrifice is at the base of the PSM theory. *Instrumental motives* include the ambition to implement meaningful work in public administration through public services (Perry, 2014).

Further, it should be noted that instrumentality operates with the ambition to work on behalf of other persons, although this ambition in some cases arrives at the level of self-sacrifice, doing a service that is not important and that does not significantly help other people (Desmarais & Gamassou, 2014). Indeed, this type of motive emphasizes the important role of attitude in PSM theory, unlike the public choice theories; this theory focuses on the instrumental motivations of the workers in public administration (Perry, 1996). *Identification motives* relate to individuals' desires to serve objects, people, or groups (Perry, 2014).

*Value-based motives* relate to those individuals who want to fulfil their actions and behaviours via a set of adopted essential public values, and such motives are considered important in shaping the concept of PSM.

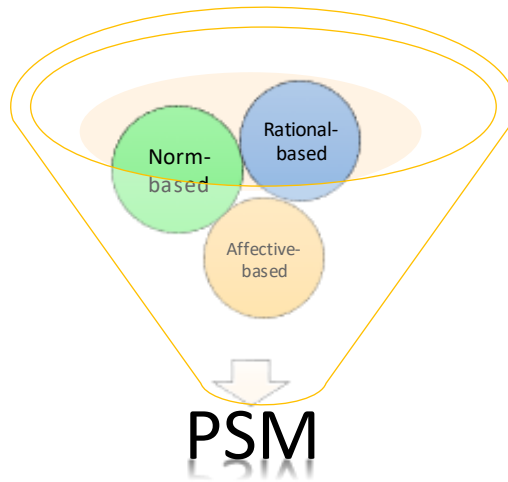
In summary, the *value-based motive* is related to morals, values, and ethics, the *identification motive* relates to attitude, and the *instrumental motive* relates to behaviour and performance (Kim, 2016; Miao et al., 2019). This reconceptualization emphasizes the centrality of the self-sacrifice dimension to the structure of PSM as a whole and improves the distinctiveness of the components of the theoretical dimension (Perry, 2014).

Based on Knoke & Wright-Isak (1982), Perry in his initial attempts to develop a PSM theoretical framework stated that the concept of PSM has three motive bases that influence individual desires to work in public organizations and for the public interest: (i) *rational-based*; (ii) *norm-based*; and (iii) *affective-based* (Perry, 1996, 1990; Pratama & Nurhidayah, 2019). Where public workers exhibit altruistic behaviour

and also intend to enhance their work efficiency, this is considered *Rational-based*.

The *norm-based* PSM considers that the primary norm in the public realm is to serve the interest of society, while *affective-based* means that public management has to offer protection for residents based on basic human legal guidelines, thereby making use of the affective norm of patriotism or benevolence (Pratama & Nurhidayah, 2019). Figure 2-3 shows the motivational bases of PSM according to the first theoretical frameworks developed by Perry (1996).

Figure 2-3: The motivational bases of PSM



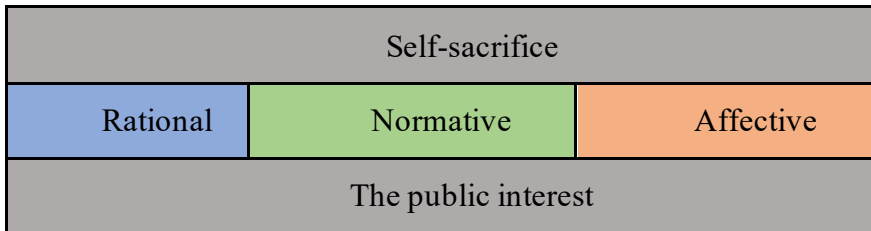
Source: own design

Following the same idea, some researchers (e.g., Bozeman 2007; Beck Jørgensen and Bozeman, 2007; Bozeman & Su, 2015) have argued that the values of motivation have interrelated connections with the terminal public values (e.g., attaining self-respect, happiness, true friendship, mature love, family security, etc.).

Bozeman and Su (2015) state that PSM has four pillars which form the basis of the theory's dimensions, namely: self-sacrifice, affective,

normative, and rational. The same structure had been proven by a few researchers (e.g., [Kim & Vandenabeele \(2010\)](#)) who took a further step to develop the value-based pillars of PSM by explaining the interconnectedness between these dimensions, as shown in Figure 2-4.

Figure 2-4: PSM value-based pillars



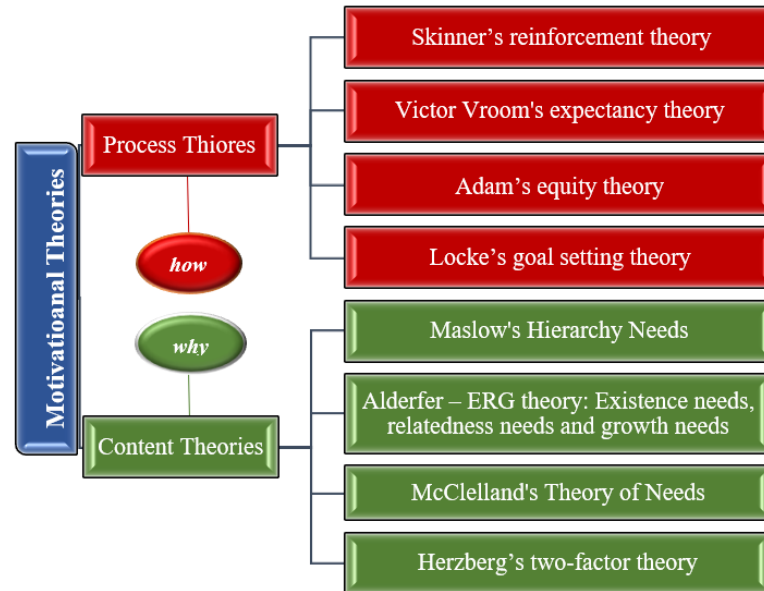
Source: own production following [Kim and Vandenabeele \(2010\)](#)

### 2.1.1 Motivational theories

Many theories have been advanced to explain how the motivation process is formed; however, there no single theory of motivation explains all the aspects of an employee’s motivation (or lack of motivation) ([Badubi, 2017](#)). A modern motivation approach, for instance, “*The Contemporary Approach*”, was developed within the framework of two types of theories. First are *Content theories*, including those of Skinner, Victor Vroom, Adams, and Locke (as shown in Figure 2-5), which focus on analyzing the human needs of individuals and which ask the question of “*what*” will satisfy those individuals in their work environment while helping managers to understand the nature of such needs and ways to satisfy them ([Campbell et al., 1970](#); [Mullins, 2005](#)).

Second are the *Process theories*, including those of Maslow, Alderfer, McClelland, and Herzberg (as shown in Figure 2-5), which focus on the reasons that lead to choosing a specific behaviour instead of other alternative behaviours; these ask the question of “*how*” – where the choice depends on the individual’s perception of his or her role in the organization and an understanding of the nature of the process that he or she needs ([Dinibutun, 2012](#)).

Figure 2-5: Classical motivational theories



Source: own design

### 2.1.1.1 Content theories

#### 2.1.1.1.1 Maslow's theory (Hierarchy of Needs)

Abraham Maslow's theory of motivation is considered the first important theory on motivation to work; following his studies of human behaviour as a psychologist (1939 to 1943), he determined a hierarchy of human needs in order to determine the components of motivation. In his paper "A Theory of Human Motivation" in 1943, he had speculated that human decision-making relies on a set of sequential psychological needs (Steers & Porter, 1987).

Maslow's Hierarchy of Needs is a motivational theory in psychology involving a five-level paradigm of human needs, often expressed by dividing them into hierarchical levels (McLeod, 2007). Maslow's theory of needs is considered one of the first theories that sought to explain human behaviour and how to satisfy human needs within an arranged framework, where the lower-order needs are represented by physiological needs, safety and security, and social needs (Belongingness and Love), while the higher-order needs include, for instance, self-esteem and self-actualization (Maslow & Lewis, 1987).

This theory can be explained according to two principles: first, the *Deficit principle*, or the very basic needs for survival and security, which declares that satiated needs do not motivate behaviour, which means that unsatiated needs do indeed motivate individual behaviour (Maslow, 1970, p. 293).

The second – the *Progression or Prepotency principle* – is based on the premise that needs at a certain level are not effective or active unless the needs of a lower level are satisfied; hence, every need must be met in a progressive manner, as in the following figure (2-4), which illustrates the theoretical content. (Maslow, 1970, p. 293; Carpenter *et al.*, 2009).

Figure 2-6: Maslow's Hierarchy of Needs



*Source: ownproduction, based on Maslow (1943)*

Despite the explanations conveyed by this theory to the phenomenon of motivation, some thinkers and scholars have reported reservations and offered critiques (Pinto, 2000), for instant by charging that it focuses only on five basic needs and turns a blind eye to many other important ones.

The most important criticism of Maslow's theory addresses its assumption that the motives involved in the hierarchy of needs are equal for all persons, in the sense that human needs begin with the Physiological and ascend into Self-Actualization, but it does not then explain the behaviour of some individuals who endanger their own existence (their physiological needs) to satisfy the needs of self-actualization. Also assumed is the sequence of satisfying needs. Whenever a need is satisfied, the individual moves to satisfy the next need, but this does not explain the exaggeration of satisfying certain particular needs, as when increasing wealth at the expense of social relations or friendship.

This theory further assumed a gradual upward fulfilment of needs – the opposite of which sometimes occurs, as when people first build a level of social prestige on self-actualization, then later fulfil 'lower' needs such as building a family, having a career, or fostering social relationships. Many will insist on obtaining increasing satisfaction of



specific needs, in contrast to this theoretical dictate of moving to satisfy new needs once previous needs have been fulfilled (Barnouti, 2001).

Moreover, it is perceived that this theory avoided having to determine the amount of satisfaction required of a person in order to then move on to the satisfaction of other needs. The theory assumes that a person begins by satisfying primary (lower) needs, then satisfies the other (higher) needs in turn, although many will satisfy their higher and lower needs at the same time. Furthermore, the theory pays no attention to spiritual and religious aspects, considered to be of great importance to many people.

Another critique of the theory is related to the stagnation of some people at a certain stage. The phenomenon of *material greed*, for example, indicates that some may remain in a certain stage for a long time despite fulfilment of their financial needs, or they may continue accumulating money at the expense of fulfilling higher needs. Some prefer stagnation in the stage of fulfilling needs related to belonging and love for others and do not move to ‘higher’ stages (Barnouti, 2001).

A most serious weakness, however, is that the theory ignores the idea that human needs cannot be fully satisfied due to permanent changes in the individual’s levels of satisfaction as a result of socio-economic and cultural developments affecting society and the individual. This paved the way for the emergence of another theory that was introduced on the basis of these criticisms – the Alderfer theory, which is addressed next.

#### 2.1.1.1.2 Alderfer theory - ERG theory

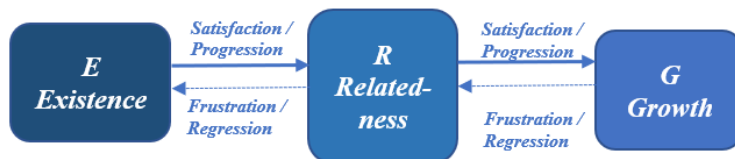
Alderfer Clinton’s theory, as noted before, is a modified version of Maslow’s theory that tries to address its deficiencies and introduces the learning factor as essential in explaining behaviour (Alderfer, 1969).

Developing on Maslow’s theory, it argues that needs can be classified into three groups: the need for *existence*, similar to physiological needs and safety in Maslow’s hierarchy (Alderfer, 1969); the need for *relatedness* – “This group of needs focuses on the desire to establish and maintain interpersonal relationships with family, friends, co-workers, and employers. This need includes the need to interact with other people, receive public recognition, and feel secure around

people.” (Alderfer, 1969) – which represents social relations and status; and finally the need for **growth** – “These needs are about the fulfilment of desires to be creative, productive, and to complete meaningful tasks to build and enhance a person's self-esteem through personal achievement.” (Alderfer, 1969) – which is similar to self-actualization in the Maslow hierarchy (Furnham, 2008; Shanmugapriya, 2021).

This theory assumes that its three groups differ in terms of the objectives and methods of *Satisfaction/Progression*, so that the individual's needs are met financially with food, housing, and other basic essentials. As for social needs, these are satiated through relationships and appreciation, while the need for growth is satisfied with development, learning, and the practice of hobbies. The theory refers to the important *Frustration/Regression* principle, which involves focusing on the satisfaction of needs that are satiated due to the inability to satisfy other needs, and this represents compensatory behaviour that may be satisfactory at times and unsatisfactory at others (Alderfer, 1972). Figure 2-7 illustrates how this theory works.

Figure 2-7: ERG theory



Source: Designed by the researcher, based on Alderfer (1969)

Nevertheless, this theory represents a qualitative addition to Maslow's theory as it gives social learning an important role in a person's motivation and behaviour, as well as an explanation of why some people exaggerate in satisfying certain needs and not others. Therefore, it cautions management to identify the important needs of workers and provide the means and help to satisfy them by moving from one stage to another (Alderfer, 1972).

### 2.1.1.1.3 Herzberg's theory (two-factor theory)

In 1959, Frederik Herzberg, a professor of industrial psychology, scientist, and practitioner, introduced a new theory that attempted to address the effect of different factors on two topics, namely: (i) the rush to perform work; and (ii) the state of satisfaction (Khalid, 2013).

Herzberg also created a two-dimensional model of certain factors that may affect the attitude of employees in the work environment; he assumes in this theory that the absence of what he calls *Hygiene Factors* such as “company policy, supervision, interpersonal relations, working conditions, and salary” can lead to job dissatisfaction, while the presence of these same factors does not necessarily motivate employees or lead to a state of satisfaction (Herzberg, *et al.*, 1959).

Therefore, Herzberg's theory is based on several considerations. Firstly, not all “motivators” used by organizations affect the creation of a valid motive for work and creativity; some of them only affect the prevention of discontent and dissatisfaction. For this reason, the term “motivations” is replaced by the term “factors” (Yusoff, Kian & Idris, 2013).

Secondly, this theory is based on two factors that an organization could provide and that affect employees' job satisfaction. Further, the two factors can be subdivided into two groups. The first group are *Motivators/Motivating Factors* for outstanding performance, which involve the need for achievement, self-regulation, responsibility, and the need for growth (Alshmemri, *et al.*, 2017).

Moreover, these motivating factors impose a sense of accomplishment, where the individual feels that he or she has succeeded in accomplishing something, as well as characteristics of the work itself, such as when the work is enriching and involves challenge or excitement; hence, the recognition of efforts achieved and the accompanying responsibility, as well as opportunities for progress provided by outstanding achievement (Malik & Naeem, 2013).

The second group, *Hygiene/Health Factors* (sometimes called “preventative factors”) help shield the work environment from complaints and incidents; these factors include the organization's policies, management, and interpersonal relationships between

management and individuals and among peers (Alshmemri, *et al.*, 2017).

It must be clarified that most of these factors are related to working conditions. This theory provides a way to explain why a person may be satisfied but not productive, or else productive but dissatisfied and full of complaints. Some organizations provide only hygiene factors and neglect the motivating factors (as in the former scenario), while some organizations show interest in the motivating factors and neglect the hygiene factors (as in the latter).

This theory, like any other, has been criticized for its shortcomings, the most important of which are:

It neglects an aspect concerned with individual differences among employees (Stello, 2011). Indeed, some factors can be a source of satisfaction for some individuals and a source of dissatisfaction for others, such as the wage; and for that same individual, they can represent a source of satisfaction in certain situations but of dissatisfaction in others. The issue of dissatisfaction can vary for the same individual according to age, social fatigue, the level of education, and the position of the individual within the organization (Gaziel, 1986).

However, decision-makers in the organizations must pay attention to both groups (motivating factors and hygiene factors) and realize the dysfunctional effect of each on job satisfaction or dissatisfaction, as the availability of health factors does not lead to a rush of workers toward high and satisfactory performance, while the driving factors (if available) are a cause leading to higher achievement.

#### **2.1.1.1.4 McClelland's theory**

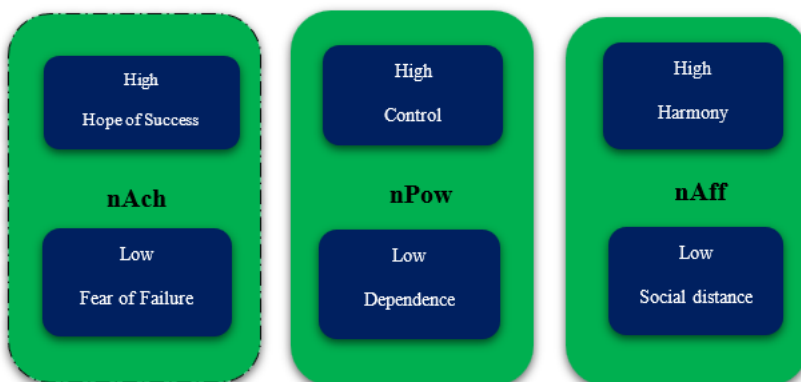
The American psychologist and researcher David McClelland formulated a theory called *N-Achievement/Need for Achievement* or the Three Needs Theory, based on a scale for determining human needs which he called the *Thematic Appreciation Test* (TAT) and its successor, the *Picture Story Exercise* (PSE; McClelland *et al.*, 1949).

Later, in 1961, McClelland extended his work in his book "*The Achieving Society*," where he presented a large number of pictures and drawings via PSE technique, where the pictures were not clear-cut to

large groups of individuals, and he believed that these individuals would reduce their important and basic needs as they interpreted these pictures. It has been concluded that there are three basic needs which vary in strength and importance to individuals (McClelland *et al.*, 1949; McClelland, 1961), namely:

**Need for Achievement (nAch):** This reflects the individual's desire to achieve in the most effective and efficient way, as well as to solve complex problems and deal with difficult tasks (McClelland *et al.*, 1949). In this respect, Clark *et al.* (1956) had indicated that the need for achievement had two palpable aspects, the *Hope of Success* (HS)/positive approach and the *Fear of Failure* (FF)/negative approach. In 1961, McClelland (1961) demonstrated that HS represents a “reward in return” motivation approach, while FF represents a “negative avoidance” motivation approach. McClelland assesses the need to distinguish between these two motivation approaches within the nAch: “both positive (approach) and negative (avoidance) motives should be distinguished because they have different effects on behaviour” (McClelland, 1961). Furthermore, “the behavioural effects of these two motives (hope of success, fear of failure) are sufficiently different to warrant treating them as distinct” (McClelland, 1961). The following figure (Figure 2-8) summarizes the theory.

Figure 2-8: Need for Achievement Theory



Source: designed by the researcher

**Need for Power (nPow):** reflects the need for control over others, to influence their behaviour and assume greater responsibilities (McClelland *et al.*, 1949).

**Need for Affiliation (nAff):** reflects the desire to form and maintain positive relationships with others (McClelland *et al.*, 1949).

We believe that the strength of these three needs increases and changes over the long term, in light of personal expertise and experience; and within the framework of this theory is that the strongest need for an individual makes him/her search for a job position that fits and meets such needs.

However, according to this theory, organizations do not need to motivate their employees but should rather pay attention to attracting and appointing those who have a high need for achievement. Hence, the goal is to attract and select those who have the readiness to achieve at a suitable level. Moreover, this feature is vital for those who occupy influential positions and jobs that require outstanding performance, such as managers, experts, researchers, and others. In this case, the administration needs support in assigning the job to a person who has a high motivation for achievement and does not wait for someone to motivate him/her to do the job.

### 2.1.1.2 Process theories

Process theories explain how workers choose certain behaviours to perform the work from among a group of alternatives and within the context of achieving basic needs for the purpose of success. This group of theories focuses on the thinking style or approach adopted by workers when they improve with the desire to satisfy a specific need. Three theories will be reviewed: justice theory, expectation theory, and goal-setting theory.

#### 2.1.1.2.1 Adams' equity theory

The theory of equity was introduced first by Stacy Adams (1965) and is based on the Social Exchange Theory (SET). Adams formulated this theory based on the perception of the individuals and whether or not they are being treated fairly in comparison to others. Individuals may feel unfair treatment when they compare themselves with others,

and they seek to remove this feeling by various means to achieve a sense of justice.

Moreover, the theory is based on the idea that workers in organizations can be better motivated if they are treated fairly and equitably, and vice versa, while inequality in their treatment will lead to discouragement, and hence poor performance, with Adams observes the relationship between the organization and the individuals working in it as a reciprocal relationship in which the workers give a set of inputs that may include, for example, the individual's educational level, experience, abilities, age, and effort they exert at work). In return, the individual obtains for these inputs returns or outputs from the organization that can include wages, appreciation, social status, returns related to the content of work, benefits given to seniority, and health and social insurance (Adams, 1965).

To demonstrate further, this theory states that employees make note of what they give to their work and what they receive in return, compared with what others give and what they receive, and this determines the fairness of the organization based on the previous argument (Carrell & Dittrich, 1978). This is demonstrated in Figure 2-9

Specifically, this theory means that the lack of a sense of justice can be a means of discouragement and a source of frustration. Therefore, the organization should make the worker feel as fairly treated as possible, where it should be noted that what is required is a sense of justice and not merely being fair; thus, it is not enough to have justice, but the employee must know that decisions are fair. Also, evaluations of employees' performance must follow specific rules and be carried out with a great deal of seriousness.

Figure 2-9: Equity theory



*Source: own production*

Adams (1965) defines claims that “inequity exists for person whenever he perceives that the ratio of his outcomes to inputs and the ratio of other outcomes to other inputs are unequal” (Al-Zawahreh & Al-Madi, 2012). Consequently, managers should pay attention to inequality inside the organization by helping to reduce or prevent perceptions of inequality between employees, where this action can help prevent employees from becoming demotivated.

In this concern, Swinton (2006) created a list of motivational expressions for employees, dividing the list into two groups, typical inputs and typical outputs, as in the following table:



**Table 2-1: Swinton’s list of motivational expressions for workers**

Typical Inputs		Typical Outputs	
1.	Effort	1.	Financial rewards (salary, benefits, perks, etc.)
2.	Loyalty	2.	Intangibles that typically include:
3.	Hard work		• Esteem
4.	Commitment		• Recognition
5.	Skill		• Reputation
6.	Ability		• Responsibility
7.	Adaptability		• Sense of achievement
8.	Flexibility		• Praise
9.	Tolerance		• Thanks
10.	Determination		• Sense of advancement/growth
11.	Enthusiasm		• Job security
12.	Trust in superiors		• Peer respect
13.	Support from colleagues		• Self-respect
14.	Personal sacrifice		• Well-being
15.	Time		• Stronger relationships
16.	Honesty		
17.	Devotion		
18.	Organization		

Source: own production based on the study of *Swinton (2006)*

However, this theory, like others, has been criticized for its shortcomings, the most important of which are as follows:

1- The theory assumes that all individuals are equal in perceiving justice while neglecting differences between one individual to another. For example, the individual may feel that he/she is not being treated fairly in the proceedings but quite the opposite.

2- The returns obtained by the individual are not limited to wages, material, and moral rewards, but social relations are also considered an expected return. Often, individuals resort to work that does not bring high financial gain, trading work with high benefits for the social relations and friendship that bind them with co-workers (*Redmond, 2010*).

3- The inability of some individuals to make a correct comparison with their peers at work. The worker may think that he is equal in abilities and skills with a colleague, while in reality the colleague may

be superior in skill, experience, and high productivity (Redmond, 2010).

4- The theory presents a kind of “fantasy” or unreality when it assumes that the individual feels unfairly treated when offered returns higher than the level those given to his or her peers at work (comparing inputs) (Huseman *et al.*, 1987).

5- This theory deals with the returns (material or moral) that an employee obtains from the organization, as if they are made randomly and according to subjective whims of the administration, forgetting that organizations have standards and systems through which such returns are distributed.

6- The theory fails to show in detail any of the means by which the employees can reduce their inputs or increase their outputs when they feel unfairly treated; this is, it speaks only in generalities, especially given that some employees at the lower levels of an organization will have no powers to control these inputs or outputs. Thus the possible procedures (i.e., quitting work, moving to another job in the organization, reducing effort, changing the returns given to other people) represent unrealistic procedures for an employee who does not have any authority and is under the supervision of managers in the organization (Carrell & Dittrich, 1978).

#### **2.1.1.2.2 Victor Vroom’s expectancy theory**

The preparation of this theory in the early 1960s is attributed to American professor Victor Vroom, who together with Edward Lawler and Lyman Porter suggested that the relationship between people’s behaviour at work and their goals is not as simple as was first imagined by other scientists. Further, this theory represented one of the most important cognitive theories to explain work behaviour and to estimate the strength of an individual’s motivation to do a job (Vroom, 1964).

Vroom defines motivation as the process of controlling choices between alternative forms of voluntary activities, an individual-controlled process in which each makes decisions based on his/her estimation of how well the expected outcomes of a given behaviour match or ultimately lead to desired outcomes (Vroom, 1964).

Nevertheless, the theory assumes that there is no “Universal Method,” as [Vroom \(1964\)](#) termed it, by which to motivate people/workers/employees. Indeed, if an individual is exposed to any sort of motivation, they do not immediately rush to obtain it; rather, a set of processes occur in their mind, and they do not actually interfere in the work required by the institution unless they find a positive or satisfactory answer to three questions (as stated by [Williams, James and Susan \(1999\)](#), emphasizing the work of Vroom). These are:

- ***(i) Am I able to achieve the desired action and thus obtain the specified result?***

Answering this question involves the first step of the theory, which is the Expectation (E) of desirable results when the individual exerts persistent effort, along with equivalent glory. This step is called “expectation of effort/performance” and it somewhat assesses the probability of success of the act ([George & Humphrey, 2021](#)).

- ***(ii) Does achieving the goal or desired action definitely lead to a reward?***

This second step, called Instrumentality (I), is where the transparency of the process is evaluated (i.e., the guarantee given to the worker that his/her success in the act will result in reward or non-punishment ([Baumhof, et al., 2017](#)). Additionally, it represents the individual’s belief that successful performance will be followed by an appropriate reward. This condition is called “performance expectation/benefits” ([Idemobi, 2010](#)).

- ***(iii) Is the reward worth the effort?***

Third, Valence (V) represents the individual’s evaluation of the benefits expected to be obtained from the completion of the work or task. Hence, it is considered the reference that the challenge represents in the eyes of the worker (for instance, the value and importance of the expected returns that he/she will get). Management may offer such

returns with a very high positive value, and vice versa (Vroom, 1964; Estes & Polnick, 2012).

These three elements are the main determinants of the individual's motivation to perform a job effectively. The elements can be expressed according to this theory in the following equation (Vroom, 1964):

Figure 2-10: Equity theory equation



Source: own production

Any value of zero on the left side of the equation means that the motivation of individuals will be zero or non-existent, so it is imperative that managers work to maximize these three values as much as possible (Redmond, 2010). Figure 2-10 illustrates the content of this theory.

Researchers have indicated that management should play its role in maximizing the expectations desired by individuals by way of the following overview:

- Maximizing expectation comes through empowering individuals and making them capable of the desired level of performance through proper selection, continuous training, support for their efforts at work, and the formulation of performance standards with complete clarity.
- Maximizing benefits and returns is done through building confidence in individuals and their knowledge of the rewards that will be awarded for every performance achieved; this trust is built through honesty in dealing and the fulfilment of promises by management, and by spreading a culture of honest and clear treatment in different situations.

- Maximizing value by helping individuals understand the true value of different rewards as well as the different results of performance by identifying, analyzing, and understanding individuals' needs and tailoring rewards to suit their needs.

#### 2.1.1.2.3 Locke's goal-setting theory

In the 1960s, the psychologist Edwin Locke broached the Goal-setting theory of motivation (Locke, 1990, 2002, 2006). Over the past five decades, this became one of the most studied theories in the realm of motivational work, especially in organizational and industrial psychology (O/I), where the development of this theory was based on almost 400 laboratory and field studies (Locke, 1990, 2002; Ismail *et al.*, 2017).

This theory's pioneers including Edwin Locke see the presence of goals as essential to determining paths of behaviour, and that the presence of goals can be a motive for the individual to achieve them, given that objectives are final goals that the individual must achieve. The following is an explanation of this theory (Ahmed, 2014, p. 154):

- 1- The presence of goals is important because they clarify the aspirations of performance, and therefore they activate and direct the behaviour of individuals to achieve these ambitions, and because they determine paths of behaviour to a certain end and not others, the goals are precisely the ambitions or intentions that the individual seeks to achieve (Ahmed, 2014).
- 2- Performance goals and ambitions are equal to the sum of the individual's values and beliefs on the one hand and his desires and emotions on the other (Ahmed, 2014).
- 3- The motivational effect of goals increases (Ahmed, 2014) when:
  - a) The goals are specific because they specify what the individual must do, and they determine for him or her the amount of effort that he or she must exert.
  - b) The goals are acceptable. When individuals accept them, the goals lead to the highest and best results.

- c) The goals are beneficial to the individual, who is more eager to achieve the goals in order to obtain the expected benefit from completion.
- d) The goals are difficult. Hard goals lead to a higher level of performance than overall goals (“do your best”).
- e) The goals are measurable. This leads to increased motivation of individuals and heightens their performance, especially when they are provided with information about their performance.

However, this theory was developed assuming that the goals stated by an organization that individuals seek to reach through completion of work may be motivating to those individuals if properly laid out and effectively managed (Locke, 1990).

The essence of this theory is that the effort exerted by the individual is determined by the degree of difficulty of the goal and the extent to which it presents a challenge on one side and the extent of its clarity and definition of features on the other side (Locke, 2002). In addition, the individual’s acceptance of the goal and his/her personal adherence to established performance standards will support his/her commitment towards its implementation and the efforts undertaken.

Also, the performance resulting from achievement of the goal is affected by the extent to which the organization supports the efforts of the individual or workers, as well as the capabilities and characteristics of those individuals working; hence, goals should adhere to specific rules/principles (namely: Clarity, Commitment, Challenge, Complexity, Feedback) (Locke & Latham, 1990; Oracle, 2012). According to Locke and Latham, those five principles for setting goals will improve the chances of success and will encourage better results if they have been applied.

Advocates of this theory such as Locke and Latham (1990) believe that setting goals enhances people’s work performance, and that individuals make greater effort when presented with organizational goals. Individuals prefer to have a specific performance goal set before them, and achieving that goal can be an end in itself.

Furthermore, Locke believes that in order to enhance individual performance, the goal must be beneficial to them within the given

context, and it must be challenging in the sense that it is neither too easy nor too difficult but contains a degree of difficulty in order to motivate workers. The goal must also be clearly defined and preferably linked to a reasonable time period (Locke, 1968).

Clearly, the theory calls for the involvement of individuals in the setting of organizational goals, to ensure their commitment and enthusiasm toward achievement. If the organizational goals have been achieved, this will be tantamount to the achievement of individual goals; and indeed, here the individual will be more impulsive and compassionate, even if the goals are difficult to achieve, which is to say that participation by the worker in goal-setting increases both loyalty and acceptance.

#### 2.1.1.2.4 Skinner's reinforcement theory

The theory of reinforcement was first introduced by B.F. Skinner based on the work of the Russian physiologist Ivan Pavlov on behavioural conditioning (Skinner, 1971; Gordan & Amutan, 2014; Basri *et al.*, 2020).

Although this is considered one of the process theories of motivation (Badubi, 2017), it differs from both Content theories and other Process theories in that it focuses on the external environment and the results or consequences arising from this environment, as well as the impact on the individual (Skinner, 1971).

Perhaps the most important assumption on which this theory is based is the *Law of Effect*, defined as “a response to a situation which is followed by a rewarding state of affairs that will be strengthened and become a habitual response to that situation” (Thorndike & Murchison, 1936).

Furthermore, this assumption (the *Law of Effect*) states that behaviour followed by pleasant results will be repeated in the future, while behaviour followed by unsatisfactory results will not be repeated (Adams, 2000). Indeed, this is the idea behind one of the most famous motivation theories in management, based on the principle of establishing desirable behaviour while trying to reduce undesirable behaviour.

#### 2.1.1.2.4.1 Types of reinforcement

Reinforcement theory involves four ways of provoking desirable behaviours from employees, (i.e., positive/negative reinforcement and positive/negative punishment (Huitt & Hummel, 1997; Sidman, 2006; Baron & Galizio, 2006); these methods are illustrated in detail below.

**Positive Reinforcement:** the Reinforcement theory promotes good behaviour with a material or moral reward, but the more spontaneous it is, the more it affects people, and this is called “positive reinforcement.” Positive reinforcement represents the increasing or strengthening of the likelihood of repetition of the desired positive behaviour by offering the worker an appropriate and pleasant reward, for example when praising an employee who always arrives to the workplace on time (Huitt & Hummel, 1997; Sidman, 2006).

**Negative Reinforcement (avoidance):** to the contrary, “negative reinforcement” is the attempt to encourage desired behaviour by rewarding the individuals if they refrain from doing something bad, in an attempt to stop unsuccessful behaviour (Bibi & Abid, 2016). In other words, both negative and positive reinforcement are used to perpetuate desired behaviours (Sidman, 2006).

This is intended to reinforce behaviour in order to avoid unwanted or unpleasant situations and consequences, for example when an individual works in order to avoid criticism from a supervisor (Huitt & Hummel, 1997; Sidman, 2006).

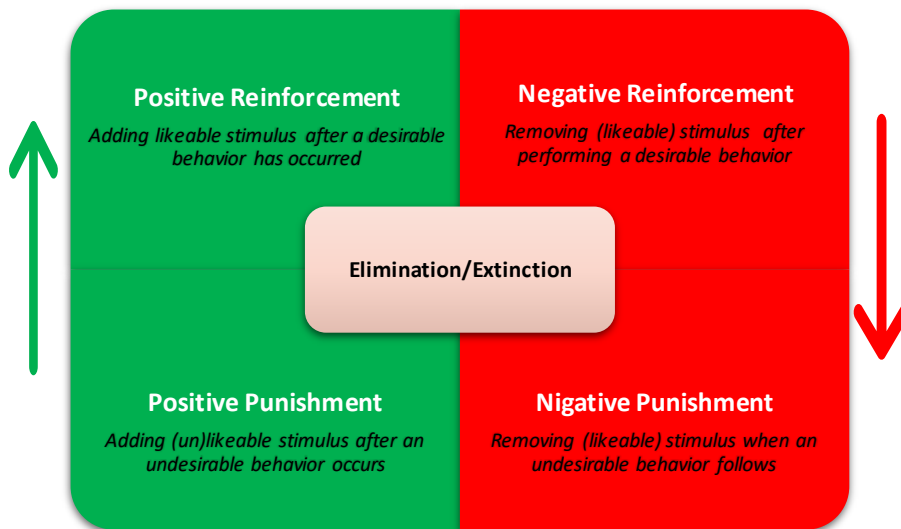
**Positive punishment:** working to discourage undesirable behaviours that result in unpleasant consequences, or consequences in the form of penalties, in order that such behaviour is not repeated (Huitt & Hummel, 1997; Skinner, 1971).

**Negative punishment:** Negative punishment, “an operant conditioning technique, reduces a behaviour or response by taking away a favourable stimulus following that action” (Huitt & Hummel, 1997). In other words, this consists of removing likeable motivation when an undesirable behaviour follows the action.



**Elimination/Extinction:** removing unwanted behaviours by discouraging individuals from such through the elimination of a reward for doing desired behaviour, also clarifying that doing the desired behaviour will no be longer associated with rewards, admiration, or fruitful consequences (Huitt & Hummel,1997; Skinner, 1971). However, the following chart represents this reinforcement theory.

Figure 2-11: Skinner’s reinforcement theory



Source: own production

#### 2.1.1.2.4.2 Timing or scheduling of reinforcement

Reinforcement scheduling refers to the frequency and time intervals between reinforcement processes (Rachlin, 1978). This matter has a significant and important impact on the speed of workers in learning and achieving the desired goals of the scheduling process, which is aimed at shaping the behaviour of the workers in the manner that the management deems appropriate.

Reinforcement can be distinguished into two types, namely: (1) continuous reinforcement; and (2) partial reinforcement. Continuous

reinforcement is the strengthening of the desired behaviour when it occurs, and this pattern is effective, especially at the beginning of learning new behaviours that require continuous reinforcement (Gibbon *et al.*, 1980).

Partial reinforcement means selecting the correct behaviours that are intended to be reinforced from among a large number of likewise correct behaviours, where reinforcement all such behaviours become an impossible state. There are four types of partial reinforcement: (1) Fixed Interval Schedule Reinforcement, (2) Fixed Ratio Schedule Reinforcement, (3) Variable Interval Schedule Reinforcement, and (4) Variable Ratio Schedule Reinforcement (Mazur, 1998; Hulac *et al.*, 2016).

Skinner's theory is not exempt from criticism. The main critics accuse Skinner of failing to take into account the conditions in which behaviour occurs, thus creating a theory too reductive to rely on the empirical method. This criticism is strengthened by drawing attention to the fact that the experimental method attempts to focus attention not only on the individual but also the context of what is happening in the environment (Al-Felfi, 2013).

In fact, Skinner's results were based on a certain number of experiments from which he extracted his interpretations and laws. He also generalized these laws, but without experimenting beyond individual cases, meaning that his experiences were limited (Al-Zogoul, 2010). One of his assumptions was that as long as his experiments were accurate and their interpretations correct, it became possible to generalize the results, but that such generalization would have to be conservative (Al-Zogoul, 2010).

Some scholars believe that Skinner's behavioural concepts are superficial and overly simple, and that his theory was unable to explain the complex behaviour of humans, as he focused only on apparent behaviour and ignored latent behaviour. Also, because he did not identify indirect behaviour, he gave it no attention (esoteric mental processes). Hence, he explained only a small part of behaviour, failing to address hidden behaviours (Al-Rabee, Kazar & Abdel-Zahra, 2013).

## **2.1.2 Public Service Motivation**

### **2.1.2.1 The concept and foundation of motivation**

First of all, it is necessary to distinguish among several terms when studying the topic of motivation. For instance, work motives mean those factors of motive that stem from within the person and stimulate within him/her the desire for work and achievement; thus it is considered an internal state or force inherent in the individuals that activate and drives their behaviour toward specific goals and feelings.

Inner states drive individual feelings and behaviour in order to reduce stress resulting from the lack of satisfaction of a specific need. It is worth noting that motives may be generated from a factor that provokes behaviour which contributes to directing it toward a specific situation. Meanwhile, need is an internal condition that makes certain results look attractive to the individual, meaning that need represents a desire to satisfy a specific deficiency or want in the individual. This deficiency may be more or less urgent, according to a priority hierarchy determined by the individuals themselves.

### **2.1.2.2 The difference between motivation and incentive**

Incentive is an environmental influencer whose purpose is to stimulate motives and achieve a response to them. Thus, it stems from the work environment; for example, a manager can present it to subordinates considering the policies and traditions of work in the organization.

Incentives are the set of influences used to arouse the motives of an individual or group and determine the content of their behaviour. Here, incentives provide opportunities for the individual to satisfy the needs that drive his motives. On the other hand, motivation is a managerial practice of influencing employees by activating motives, desires, and needs to satisfy, preparing them to provide their best to enable high performance and achievement in the organization.

If motivation is the set of forces that influence the behaviour of an individual in certain ways, then knowledge of these forces becomes necessary to make motivation fruitful in the organization. What determines the performance of an individual can be related to four

elements: (i) motivation, (ii) desire to perform the work, (iii) ability to perform the work, and finally (v) the work environment and the resources required to perform the tasks at hand.

If the worker does not have the ability or ability to perform, then that worker should be trained or replaced. If there is a problem with resources, the manager must address it; but if the problem resides in motivation, then the manager faces a greater challenge, especially since the behaviour of an individual is a complex phenomenon. Therefore, it becomes necessary for the manager to understand the problem and provide the appropriate incentive to overcome it. Thus, motivation is very important because its effects can improve performance, while its lack of tangibility can make it difficult to understand its causes.

We can express performance as a function of the individual's ability, information, and motivation as formulated in the following equation:

$$\text{Performance} = \text{Motivation} (\text{Ability} + \text{Information}).$$

This means that, despite the assumption that the individual has the ability to work, in addition to availability of information, we cannot guarantee good performance as this will depend on the role played by another essential element: motivation (Al-Alaq, 2008).

In an attempt to define motivation and differentiate between motives and incentives, Hanafi Suleiman focused on the notion that the behaviour of individuals is mainly determined according to their motives, which are considered to be *internal* forces that express their goals or needs; incentives, meanwhile, are considered to be *external* factors deriving from the surrounding environment that provide the individual with opportunities to satisfy impulses (Buzurin, 2019).

### 2.1.2.3 PSM definition

In order to understand the concept of PSM, we should first clarify the meaning of Public Services. This term has been multifariously defined as the work of those motivated people who contribute to the public and common good, or of government employees who work in public administration organizations, along with “government-funded services” (Horton, 2008).

The article by [Perry and Wise \(1990\)](#) led our understanding of the foundation of the concept of PSM, defining it as “an individual’s predisposition to respond to motives grounded primarily or uniquely in public institutions or organizations” ([Perry & Wise, 1990](#)).

That article has strongly influenced the research in this area and contributed to the theory of PSM by proposing the formal concept. Significantly, this early conceptual development stemmed from the values of public organizations. Although this definition has been used extensively in the literature, this has not prevented other researchers from developing other definitions.

Even so, Perry and Wise are recognized as the original researchers who defined PSM, initially differentiating the concept by clarifying the motivation of public organizations (and not of private ones; [Perry & Wise, 1990](#)).

Producing an accurate and comprehensive definition of the concept of PSM remains a challenge; academics have not found consensus around one definition, which has yielded flexibility and broad development. In the early stages of the concept’s development, [Rainey \(1982\)](#) pointed out that the complex nature of the construction makes it difficult to define and measure, although [Perry and Wise \(1990\)](#) did indeed create an operational definition of PSM. After three decades, there is still no universal definition for the construct of PSM, nor a unified means for its measurement. The varied results of relevant studies have caused the concept of PSM to be neglected overall ([Bozeman & Su, 2015](#)).

As referenced in [Kim & Vandenabeele \(2010\)](#), [Rainey \(1982\)](#) stated that the term Public Service Motivation was first introduced in 1982 to explain a specific type of motivation within the context of public service administration. [Taylor \(2007\)](#) defined PSM as a combination of motives that drive an individual to be involved in an action that could benefit society, and [Wright and Pandey \(2008\)](#) clarified that PSM can be operationalized as work-related values and altruistic desires to help others and to introduce meaningful engagement services for public society. [Myers \(2008\)](#) indicated that PSM is based mainly on the principle of improving the quality of public administration institutions without any special cost related to that

process of improvement (such as performance-related pay). The following table compiles some of the diverse definitions of PSM found in the literature, in historical arrangement.

**Table 2-2: The historical development of PSM definitions in the literature review**

Author(s)	Definition
Rainey (1982)	“A specific type of motivation within the public service administration context”
Perry and Wise (1990)	“Public service motivation may be understood as an individual’s predisposition to respond to motives grounded primarily or uniquely in public institutions and organizations”
Crowson (1997) and Houston(2000)	“PSM can be seen as a specific form of ‘intrinsic motivation’”
Brewer and Selden (1998, p 417)	“Motivational force that induces individuals to perform meaningful public service” (i.e., public, community, and social service); and PSM is “prevalent in the public service (i.e., the public-sector workforce)”
Rainey and Steinbauer (1999, p 23)	“A general altruistic motivation to serve the interests of a community of people, a State, a nation, or humankind”
Francois (2000, p 275)	“Inclines employees to provide effort out of concern for the impact of that effort on a valued social service”

Author(s)	Definition
Houston (2006, p 67)	“Consistent with conventional wisdom in public administration that government employment is a calling, public service motivation assumes bureaucrats are characterized by an ethic to serve the public. They act out of a commitment to the common good rather than mere self-interest. Hence, they are motivated by different rewards than those who do not answer the call”
Scott and Pandey (2005, p 156)	“A concept that denotes the idea of commitment to the public service, pursuit of the public interest, and the desire to perform work that is worthwhile to society”
Kim (2006, p 726)	“PSM can be characterized as a reliance on intrinsic rewards over extrinsic rewards”
Vandenabeele (2007)	“The belief, value, and attitudes that go beyond self-interest and organizational interest, that concern the interest of a larger political entity and that motivate individuals to act accordingly whenever appropriate”
Perry, Hondeghem and Wise (2010)	“PSM is a particular form of altruism or prosocial motivation that is animated by specific dispositions and values arising from public institutions and missions”

*Source: designed by the researcher*



While the researcher of this study favours certain definitions of PSM (Perry & Wise, 1990; Vandenabeele, 2007; Perry, Hondeghem & Wise, 2010), other definitions are less useful; for example, Kim (2006) and Francois (2000) express a *perception* or *sense* of motivation, unrelated to PSM, and this likewise applies to other definitions (Crewson, 1997; Houston, 2000) related to the perception of a type of motivation and its source.

In light of the foregoing, we take into consideration the definition of PSM by Vandenabeele (2007) as well as discussions by Wright and Pandey (2008) and Bozeman & Su (2014) of PSM and organizational practices; by this route, we formulate a definition of PSM as: the public employee's willingness to make an effort to achieve one or several organizational goals, in a way not conditioned by the extent to which certain personal needs might be satisfied as a result of that effort, and where the main driver of behaviour is to place other people's benefit over personal benefit, with pro-social motives representing a behaviour framed by self-sacrifice, values, and altruism. Public service motivation (PSM) has many dimensions, which we present in the next part of this chapter, also providing definitions and discusses for each dimension.

#### 2.1.3.4 PSM dimensions

In the first development of the concept, Perry and Wise argued that PSM has six characteristics, namely: (1) attraction to policymaking (APM); (2) commitment to the public interest (CPI); (3) civic duty (CD); (4) social justice (SJ); (5) self-sacrifice (SS); and (6) compassion (COM) (Perry & Wise, 1996).

However, as this study focuses on the non-western context, and the model by Perry and Wise can prove at times problematic and hard to measure, we have adopted (as did Kim *et al.* in 2013) models more conducive to international studies. Here we will focus on the following four aspects or dimensions of PSM: (1) attraction to public service; (2) commitment to the public values; (3) compassion; and (4) self-sacrifice, as many other researchers have done (e.g., Belrhiti *et al.*, 2019; Gans-Morse *et al.*, 2020; Wan, van Witteloostuijn & Heine, 2020; Leger, 2021).

The researcher agrees with the discussions and suggestions of [Kim and Vandenabeele \(2010\)](#) that the conceptual model of PSM as suggested and developed by [Perry and Wise \(1990\)](#) has multiple limitations, due to the ambiguity of the concepts, some of which are based on emotional states, and which overlap among sub-dimensions (motives). In addition, [Kim and Vandenabeele](#) concluded that personal gain, personal needs, and fulfilment are not appropriate for inclusion in a model of PSM, as these represent rational motives. Thus, these authors recommended their exclusion from the construct.

At the same time, many have recommended the necessity of refining PSM dimensions ([Kim and Vandenabeele, 2010](#); [Kim et al., 2013](#); [Kim, 2009, 2010, 2016](#); [Brooks-Immel, 2014](#)) to enhance our understanding of the concept and improve estimation of the behaviour of public service workers cross-nationally. In addition, several researchers (e.g., [Perry and Vandenabeele, 2015](#); [Meyer-Sahling, Mikkelsen & Schuster, 2019](#); [Kim, 2018](#)) have argued that Kim's international scale and modified sub-variables represent a great enhancement and improvement of our understanding of PSM within diverse global and international contexts, as the researcher will now clarify further.

To begin with, the dimension of attraction to policymaking (APM) has here been redefined as an attraction to public service (APS). The original elements within APM are deemed unsuitable to measuring an employee's personal attraction to participate in a policymaking because this may be misused to express dissatisfaction with politicians beyond participation in the formulation of public policy ([Coursey and Pandey, 2007](#); [Coursey et al., 2008](#); [Taylor, 2007](#); [Kim, 2009](#)). Furthermore, the dimension of APS puts greater focus on the willingness to work in the public administration sector and to contribute to social development and community ([Taylor 2007](#)).

Another possible aspect of the complexities of measuring APM may be a retreat in confidence in political systems, which can mislead a survey respondent into understanding the word "politics" in a negative way; this is an issue raised by [Van der Meer \(2010\)](#). Within that same context, [Kim \(2011\)](#) argues that poor wording around elements related

to APM can fail to capture positive individual perceptions regarding the motives that influence individuals to change politics.

In empirical studies, Kim's dimension of attraction to public service (APS) is based on instrumental motives and "focuses more on disposition to serve the public, to work for the common good, and to participate in public policy processes" (Kim *et al.*, 2013, p. 90). Furthermore, this focuses on measuring the willingness of individuals to engage and contribute to society without questioning their political orientation. Individuals with high levels of instrumental motives usually prefer to work in the public administration sector because they believe that public organizations are the best place for finding opportunities to exercise change in their society, and to engage and share in public service (Kim, 2018).

Elsewhere, from the point of view of Meyer-Sahling *et al.* (2019), attraction to public service falls into the normative rationale, and under this reasoning APS fosters ethics and public values. Individuals who admire and exhibit willingness to work in public administration are habitually seen as believers in the common good, seeking to solve social problems and helping the community without materialistic reward (Rainey, 1982). As such, those individuals attracted to public service are more likely to project actions that contain ethical and pro-social behaviours (Wright *et al.*, 2016).

The dimension of commitment to the public interest (CPI) has been redefined here as commitment to public values (CPV), which focuses on a personal tendency to pursue public values and integrity (Kim, 2009). Certain of the original elements in CPI have been excluded because they correspond with the sub-dimension of SS, while the new elements have been developed as more representative of value-based motives.

As for the dimensions of CD and CPI researched by Perry (1996) and Coursy and Pandey (2007, p.551), we find that these are already included in the dimension of CPV in Kim *et al.* (2013), so they need not be examined in this version. This is in part consistent with Coursy and Pandey (2007, p. 551) and Coursy *et al.* (2008, p. 88-89), who emphasized that CD is an aspect of CPI, which in turn is fully covered and included in CPV (Kim *et al.*, 2013).

Commitment to public values is very important for any organization because it measures the level of an individual's engagement and his/her support for a set of organizational values backed and promoted by a government, (e.g., ethics, justice, equity, the common good, future generations, [Wright, Christensen & Isett, 2013](#)).

The third dimension, compassion, is based on the concerns of individuals toward other specific individuals or/and groups. As mentioned earlier, COM is based on identification motives, which emphasize individuals' affective commitment to the needs of other individuals. Such individuals likely tend to experience a higher level of affective bonding with others, and they seek to serve others on an emotional basis, inspired by a feeling of oneness that translates to a willingness to help and do good for vulnerable persons and the public community and society ([Kim and Vandenabeele, 2010](#)). Employees with a high level of compassion also have a tendency to help their peers who are working to attain the same goals, and they share available knowledge with each other ([Kim, 2018](#)). Another important constraint on the work discussed in this area is the effect of compassion on curbing unethical behaviour, an issue raised by [Meyer-Sahling, Mikkelsen and Schuster \(2019\)](#).

Finally, the fourth dimension of PSM is self-sacrifice (SS). [Kim and Vandenabeele \(2010\)](#) illustrate that SS forms the basis of PSM; it is the foundation of understanding motives for public service, and it is related to the altruistic and pro-social origins of PSM. [Perry \(1996\)](#) stated that self-sacrifice is the willingness to perform services for others without tangible personal rewards. [Kim \(2018\)](#) arrived at the same conclusion: that the true essence of PSM means to sacrifice for others without any reward in return. This dimension has an historical relationship with how individuals view public service ([Perry, 1996](#)), and [Liu et al. \(2011\)](#) pointed out that any individual who values SS may be likely to work in the public sector.

What makes SS important is that it functions as the key understanding for all motive bases (instrumental, value-based, identification) ([Kim & Vandenabeele, 2010](#); [Heine, van Witteloostuijn & Wang, 2021](#)). In other words, a feeling of self-sacrifice is very important for the PSM behavioural process, where individuals act for

something larger than themselves, in the public interest (Papadopoulou & Dimitriadis, 2019). Moreover, self-sacrifice is among the variables that shows clear linkages with ethics, attitude, and behaviours. Where unethical behaviour is driven by self-interest and greed, self-sacrifice works to the contrary (Wang and Murnighan, 2011).

## 2.2 ETHICAL BEHAVIOUR

### 2.2.1 Definition of ethical behaviour

The word “ethics” originally derives from the Greek “ethos,” which means “habits” or “behaviour” or “attributes.” This represents a conceptual clash with a number of terms of values, ethics, norms, and traditions (Barry, 2016). The topic of ethics has recently received clear and distinguished attention from a large number of researchers, as this aspect constitutes one of the most prominent challenges that organizations will face, especially with the increasing global environmental complexities and the intensification of competition and scarcity of resources. For Daft (2001), ethics consist of the moral principles and values that govern the behaviour of an individual or a group by distinguishing between what is “right” and what is “wrong.” Ethics are defined as the personal beliefs of individuals as to whether the behaviour they practice or the decision they make is right or wrong (Barry, 2016).

For Peter Drucker, the definition of ‘management ethics’ is clarified as follows: “ethics in management is the science that deals with rational tests on the basis of evaluation between the means supporting the goals” – that is, we distinguish and evaluate with our minds the means that can be relied upon in a rational and correct way that achieve the goals to be applied or reached (Hoffman & Moore, 1982).

Ethics is also defined as the moral code that guides the behaviour of individuals regarding what is right and wrong in terms of behaviour and decision-making, where the ethical decision must take into account the best interest of others as well as the best interest of society. Frequently this definition is where individuals struggle to act ethically. Moreover, not only does ethical behaviour apply to individuals, but society itself must comply with standards of ethical behaviour.

Gaiden (1981), as cited in Al-Sakarneh (2012), does not abstract ethics from the “effects of the situation,” in agreement with Nigro (1984), where it was first indicated that ethics is the individual’s application of the values that he/she believes when performing a specific behaviour in a particular situation. Nigro argued that ethics represents a set of codified principles that order and forbid certain behaviours under certain circumstances, which are the reflections of the values that individuals take as criteria that govern their behaviour. Kinoski and Carrett (1992) did not depart from this framework in describing ethics; from their point of view, the individual imagines that most important is the relation to normal or abnormal behaviours, and they refer to the individual’s motives and personal intentions in looking at what is true or wrong behaviour.

For Bilal Khalaf Al-Sakarneh, ethical behaviour is defined as “the principles and standards that are a reference for the behaviour required for members of the same profession, and upon which society depends in evaluating their performance, positively or negatively” (Al-Sakarneh, 2012). This is also known as “the standards of behaviour that managers will guide when making their decisions or practising their organizational actions. In enabling individuals to compare and choose between different alternatives of behaviour” (Al-Sakarneh, 2012). For Mubako, Bagchi and Marinovic (2020), ethical behaviour is “conforming to accepted standards of conduct.”

Ethical behaviour is the individual act that conforms to generally accepted social standards, while immoral behaviour is behaviour that does not conform to generally accepted social standards. Therefore, ethical behaviour is the type of behaviour that is judged to be good, correct, just, honourable, and worthy of praise; meanwhile, unethical behaviour is behaviour that is judged to be wrong or reprimanded, or that has failed to meet obligation (Al-Saadi & Al-Anzi, 2002).

In this regard, Carrett and Kinoski (1992) do not deviate in describing morals as personal beliefs from which the individual begins in determining the boundaries between right and wrong; elsewhere, Schormerhorn *et al.* (2000) and Schormerhorn (2012) describe ethical behaviour as morally acceptable behaviour, about which “the least that can be said is that it is correct and appropriate.” Goetsch and Davis

(2014) agree that ethical behaviour is that which does not deviate from the boundaries of morally acceptable behaviours. Blanchard and Peals (1988) went further by precisely defining the strength of the ethical behaviour, including what they called the 4 Ps for ethical authority, which are Purpose, Pride, Patience, and Persistence, In contrast, Stead *et al.* (1990) see ethical behaviour as determined by both personal and situational factors and by historical background, personality, decision history, and management. Thus, they identify the most important basic problems that frame the cognitive response to the values and ideals that society sees or moves in accord with. Tervine (1990) referred to the role of organizational culture in determining ethical and unethical behaviours through its influence on the ideas and beliefs of individuals when they take a decision.

Moreover, Meyer-Sahling, Mikkelsen, and Schuster (2019) define ethical behaviour as what is commonly understood by ethical norms, and this behaviour might attain a minimum of moral standard, such as obeying the law, being truthful and honest, and whistleblowing when presented with unethical behaviour. It has been further remarked that ethical behaviour “is at the heart of everything we do” (Lawton *et al.*, 2013).

Simply described, ethical behaviour involves recognizing ‘right’ from ‘wrong’ and acting accordingly, whether in the workplace or in personal life (Rue & Byars, 1989). This definition of ethical behaviour is consistent with what was pointed out by Slocum and Hellriegel (2009), where personal values coming from one’s own upbringing, religion, government, society, and/or popular media can all influence what an individual considers to be right or wrong; in organizations, however, a code of ethics issued by the entity might provide its own definition (Slocum & Hellriegel, 2009).

Overall, behaviour is judged ethical or unethical based on principles, rules, and evidence stemming from a specific moral theory and a person’s characteristics or social values. Therefore, the definition of ethical behaviour faces two thorny issues: the difficulty of finding a criterion for judgment upon which all individuals agree; and that what may be called good and bad (or right and wrong) has different meanings for different people in different societies, and that conflict and

confusion arises most from objective and subjective distinctions of morality (objective when a person practices an action according to a rule or law) (Al-Anazi and Neama, 2009).

In view of all these definitions, the researcher takes into consideration the definition of ethical behaviour of Stead *et al.* (1990) as well as the definitions of Slocum and Hellriegel (2009) and Rue and Byars (1989). From this a definition emerges of ethical behaviour as a set of external and internal foundations, rules, beliefs, and controls that are formed from specific sources and that become a frame of reference for standards, governing the approach of thought, behaviour, and the behaviour of peers in an organization in order to distinguish between what is acceptable, what is not acceptable, what is legitimate, and what is illegal, thus resulting in the functional, administrative, leadership, and institutional behaviours that are morally and ethically regulated from the point of view of both the individuals and institutions involved.

### **2.2.2 Work ethics within public administrations**

Work ethics is the cultural norm that creates a positive moral value for good work, based on the belief that work is an intrinsic value in itself. A person's commitment to work ethics is influenced by experiences of socialization in childhood and adolescence, through interaction with family and peers, so that individuals learn how to determine the value of work and the behaviour that others should approach if they want to increase productivity, and this is based on praise, blame, anger, affection, and so on (Miller, 1998).

One of the important factors that constitute work ethics is relations between colleagues, managers, and the recipients who benefit from a service, all requiring a professional culture that affects the sense of brotherhood among them. Schools (education) are another important mechanism provided by society to impart a culture of work ethics to young people and instil good work attitudes (Turk & Vignjević, 2016). Therefore, work ethics must be an important element in secondary education. Work ethics amount to doing everything that is correct after knowing it fully, religiously, and socially, and when there is a conflict between two facets, then what religion has indicated must be done



without looking at the behaviour that society is accustomed to, which may not be in accordance with divine law (Cohen & Single, 2001).

### 2.2.2.1 Elements of work ethics within public administrations

The elements upon which work ethics are based are diverse and various. The researcher will focus on the most prominent. For Al-Sakarneh (2013), work ethics contain four main elements, as follow:

- 1- **Organizational culture in management:** This represents one of the most important components of management ethics, as personal values and the ethical interpretation that translates these values into actions constitute an important phenomenon, especially in the ethical decision-making process in an institution or organization (Al-Sakarneh, 2013).
- 2- **Shaping the ethics of the individual:** The formation of the ethics of an individual includes a number of sources to determine what is right and wrong – the ability to judge what is right or wrong in any situations or circumstances that an individual might face (Al-Sakarneh, 2013).
- 3- **Organizational systems:** Systems, policies, and the totality of ethical principles all contribute to the formation of management ethics, which would direct the behaviour of an individual in a specific direction. Each system has a special effect on the nature of normal behaviour, and this influence is what controls behaviour in a way that enhances or weakens the work of management ethics (Al-Sakarneh, 2013).
- 4- **The external audience:** This represents the fourth force in government systems, customers, beneficiary groups, and market forces, all of which contribute to the formation of management ethics, directing them in a specific way, especially in the contemporary world characterized by increased competition and ongoing transformations and developments (for example, in the field of technology; Al-Sakarneh, 2013).

### 2.2.2.2 Sources of work ethics within public administrations

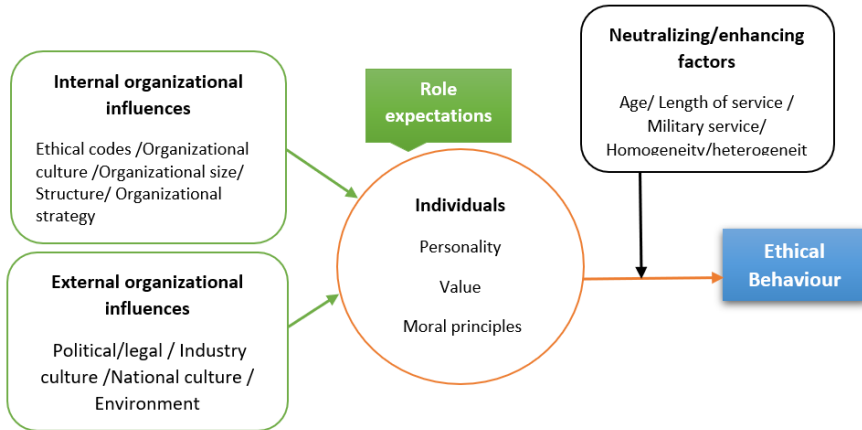
Administrative systems differ in their levels, nature, and methods of dealing with ethical issues, although this does not mean that they differ in sources or in substance. Many researchers have agreed to identify the moral and ethical sources within public organizations as follows:

- 1- **Religious sources:** The morals and virtues brought by the monotheistic religions are reflected upon a person in his dealings with God, and through good treatment and uprightness in dealing with everyone else, because all are equal before the law (Premeaux & Mondy, 1993).
- 2- **Laws, regulations, and legislation:** This is based on the State's civil service system, public service law, work regulations and rules, and administrative regulations (Wardeh, 2017).
- 3- **Social environment:** Values, customs, and traditions are among the most important sources of ethics that affect management, and the level of interaction between employees and the public on the one hand, and among the employees themselves within the organization on the other hand (Wardeh, 2017).
- 4- **Organization theories and intellectual and philosophical schools:** Scholars, philosophers, and thinkers in their different schools; scholars of management, behaviour, history, and other subjects in various colleges have sought to examine the association between rulers and the ruled (Wardeh, 2017).

### 2.2.2.3 Determining factors of ethical behaviour

Kinicki & Kreitner (2012) pointed out that ethical behaviour is simply the result of several complex factors, including moral principles, personal factors, and internal and external determinants, values, experiences. This is illustrated in the figure below.

Figure 2-12: Model of factors determining ethical behaviour



Source: own production based on *Kinicki and Kreitner (2012)*

In the above model, at the centre is the individual factor, where the individual is the decision-maker with a combination of complex traits such as values, moral principles, and unique personality. Individuals also have role expectations that are influenced by forces both inside and outside the organization.

Lastly, the individual’s ethical behaviour may be influenced by neutralizing or enhancing factors related to the characteristics of the organization’s top management. Personal skills will always play a role in how individuals make ethical behaviour decisions, along with internal factors (e.g., ethical codes, organizational culture/size/structure/strategy and external organizational factors (e.g., political/legal and industry culture, national culture, environment).

### 2.2.3 Characteristics of ethical organizations

Efforts by researchers in this field have been directed toward determining what distinguishes an ethical organization from its opposite (an unethical organization). Some have pointed out that ethical organizations are organizations demonstrating high ethical behaviour and moral integrity, with distinct characteristics represented in the following (*Schwartz, 2007*):

- 1- They have a clear vision of integrity toward external parties.
- 2- This vision is approved and implemented by top management over time.
- 3- The reward systems in the organization are determined according to the vision of integrity in the organization.
- 4- Policies and practices in the organization are determined in accordance with its strategic vision.
- 5- The organization has a state of understanding, which is that important administrative decisions include ethical dimensions.
- 6- Everyone in the organization is expected to practice their work within the framework of the conflict between individuals arising from the difference in the values that the participants hold in the presence of the organization.

In the same direction, Holian referred to the four basic principles as specifications of the ethical organization (Holian, 2002). These are:

- 1- Serenity in its interactions, both internally and with participants. The basic rule for this type of organization is its special dominant quality of implementing everything that is good for all parties concerned (Holian, 2002).
- 2- Focus on a fundamental issue, which is that others benefit from the organization just as it benefits from others (Holian, 2002).
- 3- Responsibility is individual and not collective, and this is established by delegating to individuals responsibility for the actions they take. The basic rule lies in legitimating that individuals are responsible for themselves (Holian, 2002).
- 4- Activities take place within the framework of the predetermined purposes, and these purposes are the right way for those operations practiced by members who possess high values, and these purposes are further used to determine the location of the organization in its environment (Holian, 2002).

Therefore, it is clear that ethical organizations have features and characteristics that distinguish them from other organizations. Those with the characteristics specified above can be described as ethical, while the lack of some or all of these characteristics should compel an organization to become ethical by finding appropriate means for transformation.

Here it should be noted that [Daft\(2003\)](#) in his book “Management” states that these specifications can be an effective means to bring about transformations so that the organization may join the ranks of ethical organizations, with a new focus on ensuring ethical dimensions and principles in various aspects of its construction, as indicated in Figure 2-13.

**Figure 2-13: The Three Pillars for Establishing Ethical Organizations**



*Source: own illustration based on Trevino, Hartman and Brown (2000) and Daft (2003)*

**2.2.4 Ethical standards / codes**

Ethics is a combination of rules, codes, and standards, or a system with a value derived from human sense and experience that determines whether free human activities are ultimately “right” or “bad” ([Mahanta & Goswami, 2020](#)). The code of ethics is about ‘standards of integrity

and conduct? – fundamentally to be honest, unbiased, responsible, reliable, and trustworthy (Hicks, 2007).

Ethical standards are basic expressions that reflect the values of the organization in relation to ethical and social aspects. These expressions inform employees about how the system is established and the ethical pillars on which the organization is based (Hian *et al.*, 2004), and these ethical standards tend to be in two forms. First, ethical codes based on principles; this type is designed for the overall culture of the organization, defining the basic values and implications of both the general and specific language of the organization's responsibilities, the quality of its products, and the treatment of its workers. The general expression of the principle in this framework is called the *total doctrine* of the organization. Second, policy-based ethical codes; these define the actions adopted in specific ethical situations and attitudes around practices, conflicts of desire within the organization, adherence to laws, possession of information, political talents, and equal opportunities. Ethical codes can also contribute to defining expected and unexpected values and behaviours that arise due to the actions of the top management in the organization.

As a result of implementing a code of ethics and ethical standards in organizations, the departments in organizations described as ethical can resort to strengthening and supporting these codes by rewarding obedient individuals and punishing violators; they can achieve this using proper behaviour as a means to improve the ethical climate, emphasizing the implications of that behaviour as represented in the following (Ruland & Lindblom, 1992):

- 1- Honesty: between members of the organization and with its customers, communities, suppliers, and participants in general.
- 2- Integrity: in meanings and promises.
- 3- Respect: in negotiation, communications, and relationships.
- 4- Trust/truthfulness: at the individual level and at the level of work teams.
- 5- Responsibility: for “right” and “wrong” actions.

### 2.2.5 Dimensions of ethical behaviour

[Geeta et al. \(2016\)](#) believe that ethical behaviour has been a cause for concern since ancient times. This idea has been continuously developed in the modern era, where ethical behaviour has come to represent an important aspect. However, there are many theoretical and empirical studies that explain the factors and variables that affect the ethical behaviour of the individual in the organization (and consequently ethical decision-making), but measurements of ethical behaviour are still among the most complex issues in the relevant literature. Since there is no agreement on the variables that can represent ethical behaviour, researchers have measured it from different points of view; for example, [De Casterlé et al. \(1997\)](#) measured ethical behaviour by studying two variables: (1) ethical reasoning (and consequential decisions), and (2) actual implementation of the ethical decision.

[Borchert \(2011\)](#), in his meta-analysis research, explored ethical behaviour by measuring individuals and situational factors, and these are moral identity, ethical identity, organizational culture, emotions, ethical leadership, and organizational climate.

Additionally, [Ilgan and Ekiz \(2020\)](#) explore ethical behaviour via a 1-to-10 scale item pool derived from the literature on ethical and unethical behaviour. These statements represented different variables, for instance: (1) providing a democratic working atmosphere based on justice, equality, and dignity; (2) respecting privacy, objectivity, honesty, and trustworthiness; (3) avoiding relationships based on self-interest. On the other hand, [Susilowati et al. \(2021\)](#) measured ethical behaviour by measuring “ethicality” via 12 different vignettes, inverting the results of the order ranks, where the greater the total, the more a participant is considered ethical. For [Lu and Lin \(2014\)](#), ethical behaviour consists of two sub-variables, specifically (1) juridical, ethical behaviour and (2) normative ethical behaviour. For [Hsieh et al. \(2020\)](#), ethical behaviour is measured by studying “co-worker ethical behaviour.”

Several studies (e.g., [Akaah, 1992](#); [Wright et al., 2016](#); [Al Halbusi et al., 2021](#)), have measured ethical behaviour by studying unethical behaviour or ethical misconduct. In this regard, the present researcher

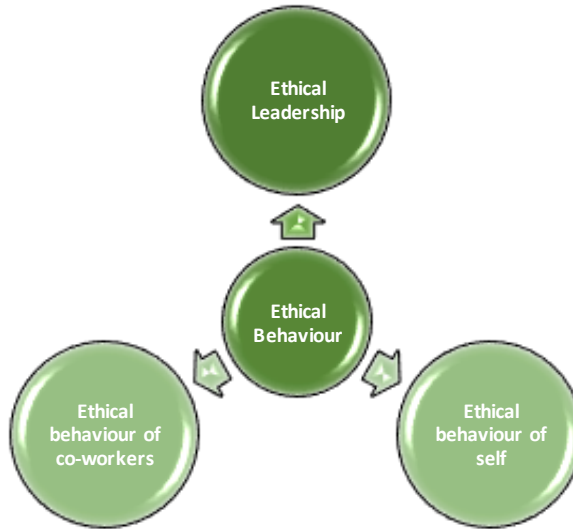
disagrees with the measurement of unethical behaviour to measure ethical behaviour, because while they may seem similar, in reality they are opposites. Such a misconception could mislead other researchers and widen the gap of limitation of our understanding of the concept of ethical behaviour, by stripping it of its uniqueness as a distinct concept. The concept of unethical behaviour represents the unethical acts that employee could commit to benefit from the organization (Umphress *et al.*, 2010).

There are many theoretical and empirical studies that explain the factors and variables that reflect the ethical behaviour of individuals in an organization (and consequently ethical decision-making). Ethical behaviour represents the moral approach for any organization, and today this is seen as a distinguishing feature. Belak *et al.* (2010) stated that ethical behaviour represents the basic or essential values of the constitutional framework for individuals working for organizations; this is responsible for setting the basic rules that define relationships and strategies among different actors within an organization, and the basic values or ethics of the organization can include the ethical climate or culture and the organization's core values.

In this study, the researcher seeks to evaluate and study ethical behaviour among three groups, specifically: (1) employees, (2) co-workers (peers), and (3) managers. To achieve this aim, ethical behaviour has been approached by studying three sub-variables: (1) ethical behaviour of oneself, (2) ethical behaviour of co-workers, and (3) ethical leadership. These dimensions have been used extensively in the literature to measure ethical behaviour (e.g., Deshpande *et al.*, 2006; Deshpande, 2009; Fu, Deshpande & Zhao, 2011; Fu & Deshpande, 2012; Tomar, 2018; Fu, He & Zhang, 2020; Keiper, Berry & Richey, 2020). The present researcher seeks to study ethics from different point of view, to obtain a general panorama of the ethics at play within the public hospitals of Jordan. The diagram below (Figure 2-14) illustrates the model of ethical behaviour adopted for this research.



Figure 2-14: Ethical behaviour dimensions



Source: own production

### 2.2.5.1 Ethical behaviour of oneself

Ethics is defined as an individual's personal beliefs as to whether a behaviour or action taken by the individual (and the decision made) is right or wrong (Barry, 2016). It also refers to a set of values, behavioural rules, and ethical principles and standards that form the foundations of integrity that operate within the framework of moral values and rules (ethics).

Therefore, ethics are always linked to principles and ideals which are far from the daily routine. This means determining "right and wrong" when the choice to be made has an impact on others, and here it must be noted that ethics were defined in relation to the individual level (Cooper, 1998), implying those employees in an organization who shape its ethics and reflect its culture. Ethical behaviour differs from one person to another, although in most cases it is judged by the individual who observes it, usually referring to behaviour that conforms to standards accepted by society, while immoral behaviour is behaviour that does not conform to standards accepted by society.

Ethical behaviour of oneself (or what is called Individual or Personal Ethics in the literature) can be defined in many ways, but these do not differ much in their core concept. However, ethical behaviour of the self refers to individual actions governed by rules and ethical principles, as a distinct form of ethics, and this represent any dogma or ethical system has been chosen by individual as an ethical guide in life (Sorunke, 2016). In this sense, ethical behaviour of the self falls under the term of self-commitment to ethical behaviour in the life of an agent. Furthermore, Li *et al.* (2014) defined it as individual norms, where it represents the normative principles of individuals regarding what is appropriate or not as behaviour.

Ethical behaviour of the self consists of multiple indicators or ethical values, namely: prudence, justice, fairness, integrity, credibility, courage, and temperance, where those values help to initiate an ethical standard to determine wrong from right and finally to delineate those things “worth doing.” In other words, these ethical values have an influence on individual choices around actions, and whether they support such actions or not. Indeed, their agreement with or rejection of a certain action is framed by their personal ethics (Li *et al.*, 2014).

In the same context, the ethics of the self can be described as an action or behavior of an individual that has a rationale and a positive resultant impact. Three factors have been identified that serve as influencing factors in the formation of individual ethics: (i) the nature of the individual; (ii) individual involvement in the community; and (iii) the environment of the individual (Baharom & Yahaya, 2006).

Ethical behaviour of the self derives its importance from the fact that it guides the decisions of individuals through situations and problems characteristic of a given job. That these characteristics form the foundations/pillars of work is recognized and approved by all, and workers perform within the work environment accordingly, so that whoever violates these special considerations will find him/herself in an embarrassing situation in front of colleagues and may be removed or punished.

### **2.2.5.2 Ethical behaviour of co-workers**

Ethical behaviour can also be observed in the culture of organizations, specifically in relationships between employees, where co-workers are expected to ensure a healthy environment by emphasizing mutual ethical behaviour and standards. Like the ethical behaviour of the self, ethical behaviour among co-workers operates within a framework of values and standards such as integrity, honesty, or justice, and these values should be maintained among all agents in an organization if an ethical atmosphere is to prevail.

Previous empirical research proposes that the perception of ethical behaviour by co-workers (peers) is more valid for the measure of ethical misconduct (unethical behaviour) than for ethical behaviour of the self (Joseph *et al.*, 2009). This assumption is based on the modification of individual behaviour within the organization through peer effects or peer pressure (Keiper *et al.*, 2020), referring to “the propensity of an individual to behave “in (ways that vary) with the prevalence of that behaviour in that group” (Halliday & Kwak, 2012).

For Pascual-Ezama, *et al.* (2015), ethical behaviour can be affected by three possible causes: (1) the influence of others (peer effects); (2) motivations as a “rational cheater”; and (3) supervision (leadership). Concerning peer effects, ethical (unethical) behaviour can influence the observer by exposing one or many good (bad) traits, prompting individuals to change their likely estimation of those traits and increasing the propensity to imitate them.

A few researchers (e.g., Andreoli & Lefkowitz, 2009) have used the ethical behaviour of co-workers rather than self-reported ethical behaviour to evaluate the ethical behaviour of the organizations, under the argument that self-reported ethical behaviour involves biases such as projection or a social desirability bias, where others attribute their own actions to peers.

### **2.2.5.3 Ethical leadership**

The topic of leadership has attracted attention from researchers as a potential success factor for any organization, especially in the modern era; due to technological and information advances and development in economic practice, organizations seek a new style of leadership in line

with the growing knowledge of society as well as workers in organizations. A leader can motivate employees to work and to participate in decisions, and leaders may care for workers and their development, which can positively impact performance within the organization.

The term “leadership” has been defined in several ways (Fleishman *et al.*, 1991). One general definition defines it as the process by which individual influences a group in order to achieve a mutual goal (Northouse, 2016). The following components form the basis for this definition:

1. Leadership is a process.
2. Leadership involves influence.
3. Leadership takes place in groups.
4. Leadership involves common goals.

Ethical leadership means acting in accordance with ethical principles both in life and in the decision-making process; put simply, this means doing the right thing. In this sense, ethical leadership seeks to build human relationships within an organization in a manner consistent with its goals (Potipiroon & Faerman, 2016). Thus, ethical leadership is seen as a set of behaviours and practices with specific controls and principles, where a high level of mutual trust has been achieved between all parties related to the organization.

It is worth mentioning that thought on contemporary management confirms that all leadership styles proposed and practiced throughout its period of development shared the ability to “influence,” but the essence of ethical leadership is based on the principle of influencing “with honour,” meaning that the ability to influence is governed by the strength of principles and morals. Whoever applies the principle of influence with honour works with a motive of morality and value for the benefit and interest of others, not for self-benefit (Sattar, 2020).

The practice of ethical leadership enhances the admiration of individuals for their leader through the creation of ideal morals that make for an attractive leader who earns respect and who shows appreciation for subordinates, enhancing their self-confidence. Such

practices can spread within an organization a culture of respect and appreciation (Tripathy, 2019).

Referring to ethical leadership, Eisenbeiss (2012) explained that this concept involves both setting and pursuing ethical goals and influencing others in an ethical manner. In this vein, Kalshoven and Den Hartog (2009) defined ethical leadership as the process of influencing the activities of a group toward achieving goals in a socially responsible manner; these authors focused on the means by which leaders try to achieve goals as well as on the ends themselves.

The study of ethics generally consists of examining questions about right and wrong, virtue, duty, justice, fairness, and responsibility toward others. From an ethical perspective, according to Ciulla (2014), the ultimate purpose of the study of leadership lies in answering the question “What is good leadership?” The term “good” has two meanings in this context: technically good (or effective) and morally good. The focus on the concept of “morally good” demonstrates that ethics are at the heart of leadership studies.

Based on the above, researchers understand that top management leaders are responsible for projecting moral values within an organizational culture that emphasizes the role of ethical behaviour and its importance for any employee in the organization. Daft (2020) concluded the same when examining how decision-makers need to accentuate the importance of ethics and values inside the organization, and how this can increase ethical behaviour by subordinates.

Modern organizations are based on adopting the idea of an ethical system in the workplace, forming a strong link to reality and the apprehensions of the organization and its requirements. This necessitates disclosure and processes of these apprehensions, knowing that at the core of the process are individuals who either (i) complain and/or reject wrong methods and procedures that take place within the organization and (ii) do not complain about superiors or colleagues, even if they face difficulties, obstacles, and work pressure (Al-Qami *et al.*, 2016).

The ethical dimension within ethical leadership means acting with others through principles of humanity, justice, non-discrimination, honesty, and transparency to achieve personal or public interests.

Morality is a main and essential starting point for the life of societies its institutions and functions, where every work is based on ethics that regulate and direct public behaviour by members of the workforce, both among each other within the framework of that profession and with others in other professions. Behaviours should be consistent with the values of society, and ethics is a common denominator among the different professions within the same society, where no profession is devoid of ethical controls that govern the actions of its members, because morality is affected by the intellectual framework and the level of civilization measured by society (Al-Zinati, 2014).

Contemporary practice and literature are shifting the focus away from traditional leadership styles, such as charismatic and transactional leadership, to focus increasingly on leadership styles that emphasize the ethical dimension, such as transformational leadership, service leadership, value-based leadership, or ‘real’ leadership. In other words, the individual who is today considered a ‘good leader’ is one who leads effectively toward ethical outcomes, as opposed to one who is simply good at leadership (as many demagogues are). This development has been reported to stress the strong links between ethics and effective leadership (Ng & Feldman, 2015).

Two models can be used to explain the relationship between ethical leadership and effective leadership – the “personal trust” model and the “social authority” model. These models are attributed to Schindler and Thomas (1993), who showed that personal trust depends on five components: integrity, competence, consistency, loyalty, and openness. *Integrity* refers to honesty; *competence* is related to technical and personal knowledge and skills; *consistency* is defined as reliability, predictability, and good judgment; *loyalty* refers to the desire to protect and conserve someone’s reputation, and *honesty* is the desire to share ideas and information for free. This model reflects the idea that followers are those who trust the leader and are ready to follow the leader’s actions, confident that their rights and interests will not be infringed.

Individual ethics derives its importance from the fact that it guides the decisions of individuals through diverse situations and the problems that the nature of the job creates. These characteristics form the

foundations/pillars of work and they are recognized and approved by all, and workers perform within the work environment accordingly, so that whoever violates these special considerations will find him/herself in an embarrassing situation in front of colleagues and may be removed or punished.

Consequently, ethical leadership is a crucial element in ethical behaviour within any organization. It has often been stated that leaders are an important organizational aspect with a significant impact on employees' ethical behaviour (Stead *et al.*, 1990; Treviño *et al.*, 2014; Al Halbusi & Amir Hammad Hamid, 2018; Al Halbusi, 2021).

### **2.2.6 Ethical Behaviour Management**

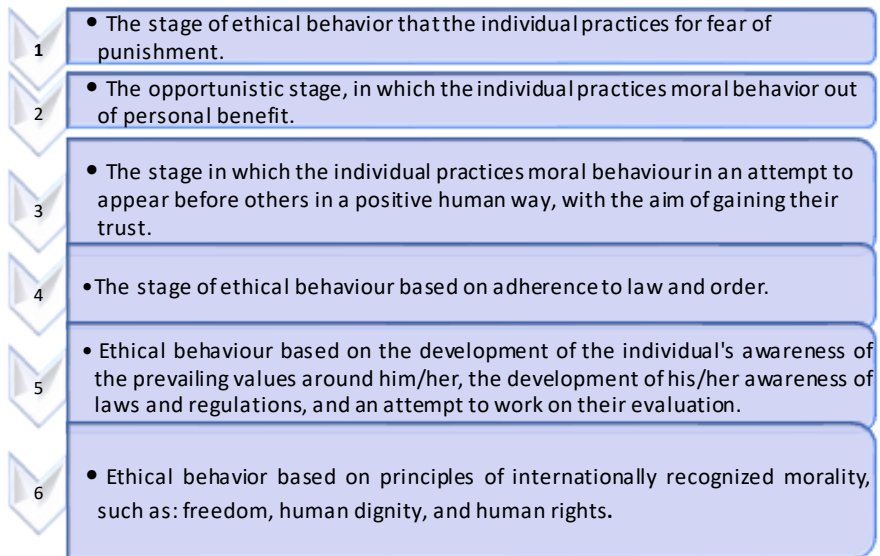
As a result of the growing awareness of ethical violations, and due to the growing sense of the importance of morals and ethical/unethical behaviours, many organizations have continuously emphasized the need for workers to adhere to ethical behaviour. But any endeavour to promote ethical behaviour must start with top management, because senior managers create the culture of the organization and determine what behaviour will be acceptable or not. Therefore, organizations must start training employees on how to deal with ethical dilemmas and impasses, such as by holding training sessions with members of the organization that include conversations about the ethical dilemmas that workers may face, and how managers can deal with such dilemmas, along with other special training programs.

### **2.2.7 Development of ethical organizations**

The American psychologist Lawrence Kohlberg, a pioneer in moral development research, identified the existence of six stages of moral development (Kohlberg, 1981). Kohlberg divided these stages into three levels: (1) the pre-conventional level, which includes the first and second stages, when the individual is in the childhood stage; (2) the traditional (conventional) level, which includes the third and fourth stages, in which the individual is within the stage of adulthood; and (3) the post-traditional (post-conventional) level, which includes the fifth and sixth stages, in which the individual has reached an advanced stage

of maturity, rational thinking, and broad-mindedness (Kohlberg, 1981), as follows:

**Figure 2-14: Kohlberg's six stages of moral development**



*Source: own production*

### **2.3 PERFORMANCE AS PRODUCTIVE EFFICIENCY: THE DEA APPROACH**

The economic theory provides an intuitive interpretation of the concept of performance and its notion as efficiency by interpreting the production function not merely as the relation between inputs and outputs but also as the frontier of the entire production process that maximises the level of outputs when production factors are given (El Moussawi & Obeid, 2011).

The analysis involves determining for every Decision-Making Unit (DMU) the optimal virtual DUM, the characteristics of each one, in terms of the relationship between outputs and inputs, constitute the solutions of a linear optimization program (El Moussawi & Obeid, 2011). The difference between the DMUs located (or not) on the productivity frontier helps to detect a set of efficient and inefficient



DMUs. However, the DMUs with a production plan situated on the production frontier are considered to be efficient. On the contrary, DMUs with a production value placed below the frontier are considered to be inefficient.

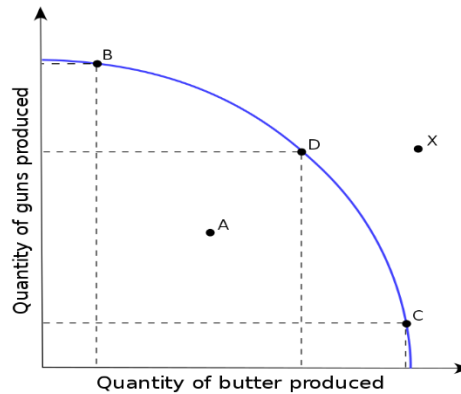
In microeconomic theory, productive efficiency is a condition when the economy or an economic system (e.g., universities, hospitals, banks, or countries), within the constraints of current industrial technology, it is impossible to increase the production of one good without sacrificing production of another (Sickles & Zelenyuk, 2019).

Straightforwardly, the notion of this concept could be illustrated on a Production Possibility Frontier (PPF), where it is the curve of all the maximum production potential of two goods/services, given a set of inputs containing resources and other factors, where it is assumed that all inputs are used efficiently, and factors such as labour, capital and technology, among others, will affect the available resources, which you will spend where the production potential frontier lies, and the production potential boundaries are also known as the “Transformation Curve” or production possibility curve (PPC).

The production possibility frontier (PPF) illustrates the idea that opportunity costs typically come about when an economic organisation with limited resources has to decide between two alternatives, and the PPF is graphically depicted as an arc (Figure 2-15), with one good on X-axis and the other on the Y port, and at each point on the arch, there is an effective number of two products (commodities) that can be produced with the available resources; therefore, it is up to the organisation to consider the production potential limit and decide what number of commodities should be produced to achieve the maximum overall benefit to the economy.

The concept of productive efficiency had much interest in preliminary studies carried out by several pioneers in the domain (e.g., Koopmans, 1951; Debreu, 1951; Farrell, 1957). For instance, Farrell (1957) was the first schooler to decompose the concept of productive efficiency into two components, namely, technical efficiency and allocative efficiency; hence, the combination between both components (technical efficiency and allocative efficiency) helps to assess the global (or total) economic efficiency.

Figure 2-15 Production Possibility Frontier Curve



Source: own production - hypothetical production possibility frontier (PPF)

Productivity was and still is one of the most important topics that impose itself on the research arena from specialised researchers, those interested in economic and social development, whether in developed or under developing countries, and it is notable how this topic has received as much attention and circulation in the contemporary economic literature, in particular, during the past two decades, occupied the first ranks in the concerns and apprehensions of individuals and governments together. The same topic has captured and still has similar interests in many international and regional organisations and institutions.

The concept of productivity is considered one of the most common economic concepts at the present time, despite its recent use by economic researchers, but it is believed that this concept at the same time is relatively old. Where it dates to the eighteenth century, and the first to talk about it were the Physiocrats, especially by one of their theorists (Dr. *François Quesnay*) in 1774. However, since then, ambiguity and confusion have prevailed in this concept, and this topic became a subject of discussion and controversy until recently when economists and others began writing about the concept of productivity, more precisely, and clearly and presenting studies and theories about it.

Productivity can be described as the division of output over input (Rasmussen, 2011), or it is the amount of production attributed to an

element of production. In other words, productivity in the simple sense is the quantity of production resulting from the use of a productive factor, especially labour or capital, or as stated by (Rutherford, 2007), it is the quantity of production from the use of several factors of production.

Consequently, productivity is a value that indicates the percentage of inputs that were used in production. So, productivity is the ratio of real production to the amount of real physical inputs. Thus, its relativity expresses what was actually produced attributed to a theoretical measure of what should have been produced, as it is defined as a continuous improvement in the efficiency of the organisation resulting from the efficient use of available resources, labour and machinery, etc. (Kendrick, 1977). However, in many production scenarios, it is necessary the consideration of many inputs and outputs. Furthermore, calculating efficiency for a more realistic scenario with several inputs and outputs is challenging.

On the other hand, productivity and efficiency are used interchangeably as terms repeatedly. Straightforwardly, productivity is the amount of production resulting from the use of a productive factor, allocating labour or capital, and it is the amount of production resulting from the use of several factors of production. Alternatively, efficiency is a relative concept and can only be calculated with respect to a reference point. More, efficiency can incorporate the concept of the production possibility frontier, which indicates feasible output levels given the scale of operation. Therefore, the concept of productivity may embrace but is not confined to the notion of efficiency.

The concept of productivity can be illustrated graphically if we assume the availability of data for several units (in our example are hospitals), and each of these units has one element of production (labour (X)) and one product (health care services (Y)).

Table 2-3: Data for hospitals Example

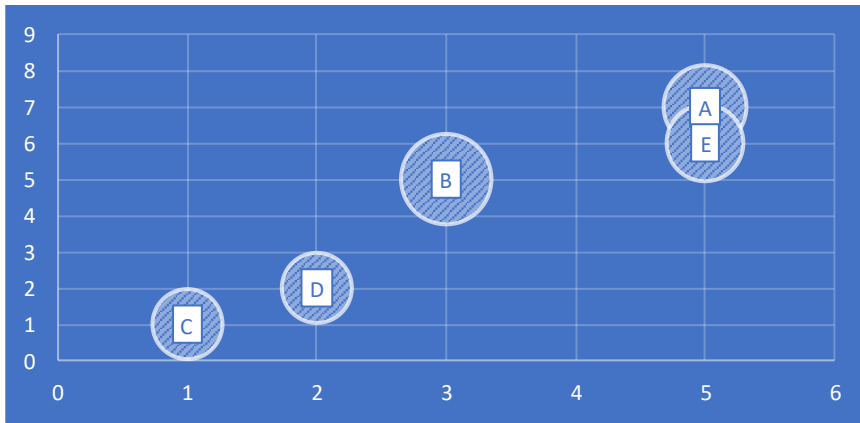
Hospitals (Units)	Inputs Labour (X)	Output Health services (Y)	Productivity (Y/X)
A	5	7	1.40
B	3	5	1.60
C	1	1	1.00
D	2	2	1.00
F	5	6	1.20

Source: own production based on *Coelli et al. (2003)*

The last column of the above table shows the unit productivity. For example, the productivity of unit B equals (1.60), which represents the highest level of productivity among the hypothetical units, while the productivity of units C and D are the least productive, with the value of (1).

However, Figure (2-16) shows the productivity ratios of the units. To depict the productivity ratios graphically, a line can be drawn that connects the point of origin and the productivity ratios. This line is the ratio of the output to the input, which is equal to the slope, and the slope of each line reflects the productivity of each unit. The steeper the slope, the higher the productivity of the unit. Therefore, we find that the slope of unit line B (which achieved the highest productivity) is the steepest, while the slope of the units C and D are the least steep, as is illustrated in Figure (2-16).

Figure 2-16: Graphic Illustration of Data example



Source: researcher design based on the data in the table (2-3)

### 2.3.1 Efficiency and Data Envelope Analysis Efficiency

Efficiency expresses the extent to which the economic unit succeeds in terms of the relationship between the used resources and outputs efficiently aimed at maximising outcomes and reducing inputs. As a result, the unit succeeded in mobilising its resources with the required efficiency in achieving the goals it set in its production plan. Nevertheless, efficiency in its general concept represents achieving the greatest production level at a certain level of technology and available resources (Dodge, 2005).

More precisely, efficiency is studying the relationship between actual and target values of outputs and inputs. This relationship can take the form of the ratio of actual outputs to the greatest level of targeted outputs achieved from a certain level of inputs, or it is the provision of the lowest level of targeted inputs to the actual inputs that achieve a certain level of outputs (Fried et al., 1993). It can be said that the terms productivity and efficiency are sometimes used interchangeably.

This misperception is due to the large overlap of the two concepts. Suppose we calculate the productivity (for a group of economic units) and determine the least or the best production unit. In that case, efficiency can be defined as an indicator used to arrange productivity values. So, productivity is a value that indicates the percentage of inputs

that were used in production, and efficiency is an indicator of the values (Salerno, 2003).

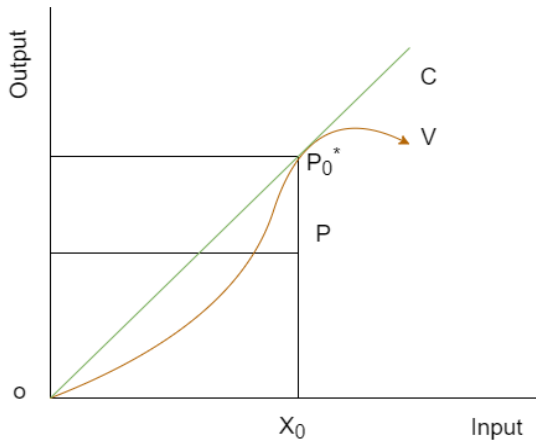
### 2.3.1.1 Efficiency Classifications

There are many types of efficiency, and each of them has its own perspective on inputs and outputs. Some scholars and economists (e.g., Coelli, et al., 2005; Greenwald & Stiglitz, 2013) believe that the concept of efficiency can be reduced to the following types:

1. **Relative Efficiency (RE):** An organisation is classified as efficient on the basis of the available evidence only if the performance of other peers does not prove that a number of its inputs or outputs have a space of enhancement without worsening some of its other inputs or outputs (Odeck, 2000).
2. **Technical Efficiency (TE):** which implies the type of efficiency that represents the capability of the unit/organisation to achieve the greatest output or service in light of the available set of resources (Coelli et al., 2005). Technical efficiency means that producing a maximum output is achieved with a given input or that a given output is achieved with minimum input. However, TE is measured by the ratio between the physical quantities of the output.

The next Figure (2-17) can be employed to clarify this concept. In this Figure, we assume that the unit uses one production element and achieves one product, and we also assume that the unit works at constant returns to scale. The line O-C represents the production possibility curve, and any point on this curve represents the full technical efficiency of the unit, as for the points that fall below the curve, it represents the inefficiency, point  $P$  represents the unit inefficient, while point  $P_0^*$  represents the unit technically efficient.

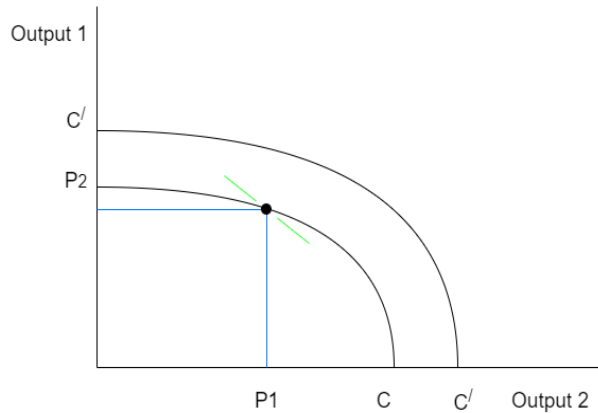
Figure 2-17: Technical efficiency for one product



Source: our reproduction, based on the study of [Jacobs et al. \(2006\)](#)

In contrast, if we assume that the unit achieves two products and uses only one production element, Figure (2-18) can be used to clarify this case, at a certain technical level, the equal cost curve  $C'/C'$  gives the possible harmonizations of the outputs that can be achieved within the limits of the element.

Figure 2-18: Technical efficiency for two products



Source: our reproduction, based on the study of [Jacobs et al. \(2006\)](#)

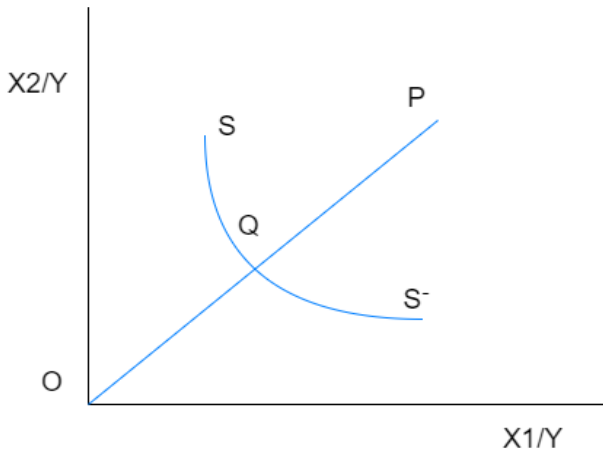
Technical efficiency (TE) has two orientations, input orientation, and output orientation, where the values of technical efficiency are between 0 and 1; hence, the DMU that has a value of 1 is considered to have a perfect TE.

Input oriented TE tends to support the interest in the inputs and the attempt to reduce them with the stability of the outputs. To clarify this orientation, we assume the existence of a hospital that produces one output ( $Y$ ), using only two inputs, namely ( $X_1$ ) ( $X_2$ ) and with the stability of the size, where Figure (2-19) illustrates this. As the curve,  $SS'$  represents the production curve, and any point located on this curve represents the complete efficiency. Therefore, we find that point  $P$  is inefficient, while point  $Q$  is efficient because it is located on the curve  $SS'$ . To calculate the technical efficiency of point  $P$  according to this approach, we use the following equation:

$$TE = \frac{OQ}{QP}$$



Figure 2-19: Input Oriented Technical Efficiency Illustration

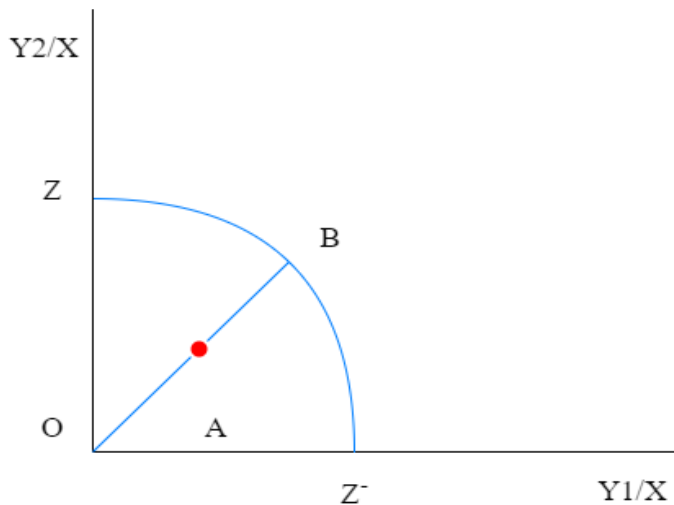


Source: own reproduction based on the precious studies

On the other hand, output-oriented TE supports the interest in outputs and the attempt to increase them with the stability of inputs. To explain this orientation, we assume, as in the previous example, that a hospital produces two outputs,  $Y_1$ ,  $Y_2$  using one input,  $X$ , assuming the stability of scale returns, which is illustrated in Figure (2-20). Where we can see that point, A is an inefficient DUM (a hospital in our example), as it lies at the bottom of the curve, and we cannot increase the production of the hospital from its two outputs except by increasing its only input. The TE of the inefficient hospital A is calculated as follows:

$$TE = \frac{OB}{OA}$$

Figure 2-20: Output Oriented Technical Efficiency Illustration



Source: our reproduction based on the previous studies

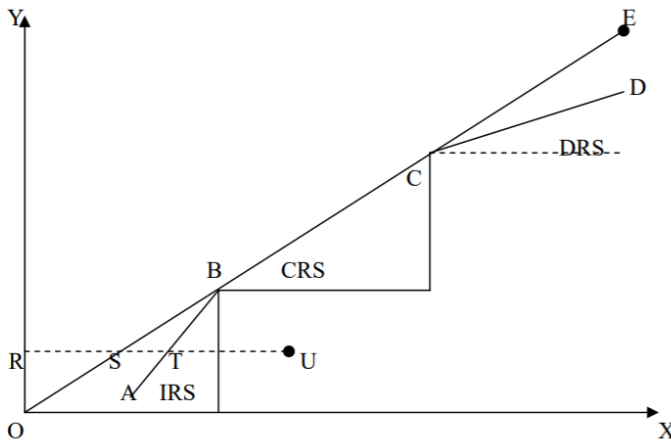
Based on [Diacon, et al. \(2002\)](#), [Fukuyama \(1997\)](#) and [Qiu & Chen \(2006\)](#), technical efficiency (TE) can be split into *Pure Technical Efficiency* (PTE) and *Scale Efficiency* (SE), as shown in Figure (2-21). Purely technical efficiency refers to the organisation's ability to avoid waste by producing as much output as input consumption allows. Otherwise, it shows whether the DMU can achieve maximum production under certain constraints. This measures the extent to which an organisation can decrease its inputs (in fixed proportion) while remaining within the VRS frontier. Therefore, TE measures the DMU's overall success at utilising its inputs. Scale efficiency refers to the organisation's ability to work at its optimal scale. Thus, the scale can also affect the efficiency of a DMU. Following the above discussion, technical efficiency can therefore be seen as the measure by which inputs are transformed into outputs, or simply as the output/input ratio ([Qiu & Chen, 2006](#)).

To clarify, we only consider the case of one input (X) and one output (Y). In Figure (2-21), the line OE implies the production frontier with CRS. While the lines AB and CD are both production frontiers with VRS. Nevertheless, ABCD illustrates how the production moves

from increasing RTS to CRS and to DRS. Presuming that U is the actual production point of a DMU. Then the following formula can be achieved as:

$$\text{Technical Efficiency} = \frac{RS}{RU}$$

Figure 2-21: Splitting of Technical Efficiency



Source: reproduced based on [Qiu and Che \(2006\)](#)

The definition of technical efficiency under these circumstances requires a certain output; the input on the border with CRS is divided by the actual input. This definition is based on input. With similar reasoning, also the definition can be achieved based on output. At this point, the frontier with CRS represents efficient production, which means that any point on this frontier is technically efficient.

**2.1 Pure technical efficiency:** The definition of pure technical efficiency requires the same level of production; the input on the production line with VRS is divided by the actual input. It is noted that

pure technical efficiency uses a production line with variable returns to scale. From an economics perspective, this removes the scale constraints. Then, the inefficiency only lies in the factors such as productivity, resource allocation and management (Qiu & Chen, 2006). So, in this case, the pure technical efficiency formula can be achieved as:

$$\text{Pure technical efficiency} = \frac{RT}{RU}$$

**2.2 Scale efficiency:** The definition of scale efficiency assumes an equal level of production. The input at the production frontier with CRS is divided by the input at the production line with VRS. In contrast to pure technical efficiency, only the scale factor is found to be effective here, while the productivity factors, resource allocation and management are excluded, and we can measure it using the following formula (Qiu & Chen, 2006):

$$\text{Scale efficiency} = \frac{RS}{RT}$$

Scale efficiency assesses the degree to which a unit can expand according to the size of its operations, or it is the amount of change in production due to a change in production factors at the same time (Bikker & Bos, 2008). The unit may operate at a diminishing, increasing or CRS. If the use of the inputs of the factors of production increases by a certain percentage and the production increases by the same percentage, then we have a case of CRS (Daraio & Simar, 2007). But if the rate of increase in the use of the production factors is greater than the percentage of the increase in production, in this case, we have a Decreasing Return to Scale (DRS), but if the percentage increase in the use of production factors achieves a greater percentage of increase in production, we have here the case of the Increasing Return to Scale (IRS, Ahuja, 2017).

**3. Allocative Efficiency (AE):** It is concerned with minimising production costs given the right combination of

inputs for a given level of output and a range of input costs, assuming that the unit under study is operating at full technical efficiency. Allocation efficiency is expressed as a percentage value of 100 for the unit using its inputs in a ratio that minimises costs. In other words, an entity can be 100% technically efficient using best practice but not fully efficient concerning allocative efficiency, which means the best combination of inputs. In other words, as stated by [Cave et al. \(2007\)](#), AE is “*producing a bundle of services so composed that no other bundle could improve the well-being of an agent without harming that of another agent*”.

4. **Economic Efficiency (EE):** It is a consolidation of TE and AE. Where it measures the production of a maximum value of output with a given value of input or, in other words, the use of a minimum value of input to produce a given value of output, consequently, it can be measured by the ratio between the value of output and the value of input ([Bhat et al., 2001](#)). Nevertheless, Economic efficiency depends on the Pareto criteria, that is, being able (or not) to improve the well-being of one economic agent without harming that of another ([Freyens & Yerokhin, 2011](#))
5. **Pareto Efficiency (PE):** a central concept in economics, where we speak of Pareto efficiency when there is no way to rearrange things so that at least one person is better off without anyone being worse off. The importance of PE is because it provides a weak but widely accepted standard for comparing economic outcomes. It is a weak standard because there can be many efficient situations, and the Pareto test does not tell us how to choose between them ([Qiu & Chen, 2006](#)).

### 2.3.2 Data envelopment analysis (DEA)

#### 2.3.2.1 The origin of the concept and the historical development

The DEA method began in 1979 with the dissertation research of Edwardo Rhodes at the Carnegie Mellon University Carnegie Mellon School of Urban & Public Affairs, now the H.J. Heinz III School of Public Policy and Management in Pittsburgh, Pennsylvania, United States. Under Cooper's direction, Edwardo worked on an educational programme in America to compare the performance of a group of minority students (mainly Black or Hispanic) in similar school districts in public schools in the United States with federal government support. The challenge faced by the authors is to estimate the technical efficiency of schools that include a set of comparable inputs and outputs without providing information on their prices, which resulted in the formulation of the (Charnes, Cooper, and Rhodes) CCR ratio form of DEA and the first publication (Odeck, 2000).

Data Envelopment Analysis (DEA) is a technique that uses linear programming to determine the optimal mix for input and output groups for Decision-making units (DMUs) with similar goals, based on the actual performance of these units (Cooper et al., 2007). It is also known as a nonparametric method used in operations research, economics, and management to estimate production limits and is applied in an empirical way to measure the productive efficiency of DUMs when production processes represent a "multi-input-output structure." A nonparametric method for analysing the efficiency of units in relation to their best peers and diagnosing inefficient unit benchmarks.

Farrell's study (Farrell, 1957) is considered the basis for the DEA method, but it is flawed in Farrell's method for measuring the technical efficiency of one output and one input only, while the DEA method is characterised by dealing with a group of outputs and inputs. Moreover, DEA depends on (*Pareto-Optimality*) optimisation, which states that any DMU is inefficient if another DMU or a mixture of DMUs is able to produce the same amount of output with less quantity of inputs and without an increase in any of the inputs, and the unit (the organisation)

is considered efficient if the opposite scenario is achieved ([Al-Shadokhi and Bahramuz, 1997](#)).

It can be concluded from the previous definitions that:

1. The existence of a number of administrative units or the so-called Decision-Making Units and called them in short (DMU), and these units work in the same field or group of (i.e., hospitals, education organisations, banks, etc.) perform the same function, where the efficiency of these units can be measured by comparing each branch or unit with the rest of the other units in the group.
2. These units use the same set of inputs and outputs.
3. The general objective of the method is to maximise the quantity or number of outputs of these units or reduce the quantity (or number) of their inputs ([Al Shaya, 2008](#))
4. Data envelope analysis is a diagnostic tool that reveals to the decision-maker the reasons for the inefficiency of the business institution and how to transfer it from its current state of inefficiency to an efficient institution.

Data envelopment analysis method is a nonparametric method that relies on liner programming methods. This concept provides an objective assessment of the “efficiency of a number of similar institutions relative to each other”. Thus, this method can be used to estimate the production function of a group of institutions ([Cook & Zhu, 2005](#)).

Also, DEA is considered one of the frontier analysis methods, as it exceeds the methods of measuring efficiency based on (Cost Functions) or (Production Functions) because it estimates the efficiency relative to the best results achieved across the DMUs under examination/analysing, not based on the average of the results ([Stiefel et al., 2006](#)) and therefore the estimates of DEA are called Relative Efficiency estimation. Hence, the efficiency is derived through a number of DMUs that together form the performance frontier curve, which encapsulates all observations.

However, the DUMs that lie on the (Frontier Curve) consider efficient in the process of distributing their inputs and producing its outputs, while the DMUs that do not fall on the border curve are considered inefficient, and the method is based on the evaluation of each institution in relation to the best institutions, or what is called the Best Performance (Al-Sakka, 2008). Decision-making units (DMUs) are categorised based on the achieved efficiency levels on the basis that the best performing DUMs among the group items get a value equal to (1), and the least efficient institutions get values less than one, and the lower the calculated measurement for the DUMs, the lower its efficiency.

The classification of DMUs based on efficiency in DMUs has its roots in the work of earlier economists, including *Edgeworth* in 1881 and *Pareto* in 1906, on which economists built their theories and experiments later. The use of economic and financial resources represented the best method for measuring efficiency, starting with the early attempt by the economist (*Debreu, 1951*), which was characterised by its shortcomings in the analysis of efficiency, and then was followed by an attempt by the economist (*Malmquist, 1953*), which included the proportional scaling (*Clement, 2007*). Later in 1996, a new theory had emerged; it was called the X-efficiency of the economist (*Leibenstein, 1966*), and the recent attempts were of the economists (*Charnes, Cooper & Rhoode, 1978*) were called the Data Envelope Analysis (DEA).

Through the historical sequence of theoretical foundations for estimating efficiency (Malmquist, Leibenstein, and Pareto), the researcher will review the ideas that it dealt with efficiency and how to analyse it in detail according to its chronological sequence in order to arrive at the modern concept of efficiency, but with DEA method, as follow:

- 1- **Pareto Efficiency:** In 1906, Pareto came to find a concept of efficiency that came to be known as Pareto Optimization (*Pareto-Optimality*), which states, “*Any possible allocation of resources is either an efficient allocation or an inefficient allocation, and any inefficient allocation of resources expresses inefficiency*”



(Bourqaba, 2008). Said otherwise, it is not possible to increase the output of one unit without harming another unit if resources are constant and consumers increase, which is expressed in economic efficiency (Ahuja, 790, 2000).

**2- Malmquist Efficiency:** Malmquist in 1953 reached to find an indicator that links the movement of productivity between two comparable periods and determines a specific and symmetrical place for each unit. More, the indicator is distinguished by not assuming a throughput equation for the data used. Instead, the theory takes the inefficiency of the inputs results from the inefficiency in the use of the inputs, and the inefficiency of the outputs results from the inefficiency in generating outputs, which are the two main determinants of reaching the efficient limit during two periods (Badur, 2002).

**3- X-Efficiency:** It is known as operational efficiency, and it is defined as “the efficiency in using the inputs”, or the monetary unit that is spent in the form of operating costs specifically it shows the lowest cost that can be spent to produce a mixture of outputs compared to the cost The actual expenditures (measuring the deviation of the current values from the expected values that represent the efficient limit). X-Efficiency measures the extent to which the overall efficiency deviates from its optimum level, as this deviation is due to other factors affecting the elements production such as management skills, the technology used, incentive systems, wages, etc. Therefore, the higher X-Efficiency in an organisation means reasonable control of these elements.

### 2.3.3.2 DEA Terms of Use (Assumptions and rules)

The method of DEA, as a tool that helps measure the efficiency of different sectors and several types of organisations, as it identifies the best performing among the different units and the worst-performing among the studied units, and it also aims to work to raise the level of efficiency by contributing to setting goals, as well as monitoring efficiency over time.

The organisations whose efficiency is to be measured using the DEA method are called the decision-making unit (DMU). The DMUs

represent each entity responsible for transforming inputs into outputs where its performance can be evaluated, as it can represent hospitals, banks, universities, etc. The assumptions for conducting the efficiency assessment process using the DEA method are as follows (Cooper et al., 2007):

- **Selecting identical units:** they are represented by a group of commercial banks or a group of financial institutions because their inputs are equal, and their outputs are equal.
- **Linear relationship between inputs and outputs:** meaning there is a direct relationship between inputs and outputs, so an increase in inputs should lead to an increase in output.
- **The relationship of variables to sample size:** the number of variables must be less than the number of assessed units. For the success of using the DEA method; one of the following three rules must be met (Cooper et al., 2007):

**Rule 01:** The sample size must be greater than the number of inputs multiplied by the number of outputs; otherwise, the model cannot distinguish between efficient units and inefficient units.

**Rule 02:** The sample size must be greater than the product of the inputs and the outputs by the number 3.

**Rule 03:** It is called the rule of thirds, where the number of DMUs with full efficiency should not exceed one-third of the studied sample.

### 2.3.2.3 Measurement methods (parametric vs nonparametric)

Research and studies in the literature use different approaches to assess and measure productive efficiency, namely: (1) parametric (i.e., Stochastic Frontier Approach (SFA), Distribution-Free Approach (DFA), Thick Frontier Approach (TFA)), (2) nonparametric (i.e., Data Envelopment Analysis (DEA), Free Disposal Hull (FDH, Oh & Hildreth, 2016; Toma et al., 2017; Asmare & Begashaw, 2018). If the econometric model has all its parameters infinite-dimensional

parameter spaces, it is labelled as “Parametric”; on the other hand, if the econometric model has all its parameters in infinite-dimensional parameter spaces, it is labelled as “nonparametric” (Murillo-Zamorano, 2004). Given the nonparametric nature of this study and the adoption of the DEA technique, the researcher will focus on the nonparametric method of performance measurement as a result.

Nevertheless, in the arena of productive efficiency research, the most practised approach is DEA (Cooper et al., 2011; Asmare & Begashaw, 2018), where the technique of DEA was originally developed to measure a variety of non-profit institutions with high resistance to traditional performance measurement methods, for instance, educational and medical institutions, where the high resistance stems from the ambiguous relations and the complexity between a plethora of multiple inputs and outputs, with taking into consideration a frame of non-comparable factors (Roman, 2017).

The difference between these two methods lies in the assumptions applied to the data and taking or not taking into account random errors. Parametric methods depend on efficiency in costs, while nonparametric methods depend on the relationship between inputs and outputs. Parametric methods are adopted in the presence of a functional form of a production function such as Cobb–Douglas production function and the logarithmic transcendental function, as it is estimated through the data of the studied sample, while nonparametric methods build production limits through the use of linear programming, and therefore all observations take into account the functional form of the production function (Mahaftha, 2005).

Researchers have found that parametric approaches are best suited for industries with well-defined technologies to minimise the risk of misspecification. For sectors with unclear usage of technologies, such as the service sector, nonparametric approaches are more flexible and may be more suitable (Charnes et al., 1978). Though, both the parametric and the nonparametric (mathematical programming) approaches use all the information contained in the data. Alternatively, in the parametric approach, the single optimised regression equation is assumed to apply to all DMUs. Decision-making units (DMUs) are the economic or non-economic organisations or units whose performance

is to be measured by a specific, adapted DEA model. These units should be homogeneous, operate in the same area and have the same input and output variables (Qiu, et al., 2022).

It is worth mentioning that the nature of the DMUs is diverse. here DEA has been used to study the efficiency of banks, hospitals, warehouses, public programmes, software project development, academic departments, universities, educational programmes, retail facilities, market efficiency and welfare losses, insurance companies and vendors (Avkiran, 2011; Coelli et al., 2005).

To sum up, both methods of efficiency analysis (parametric and nonparametric) have their own pros and cons. For example, nonparametric methods leave no room for noise. Alternatively, parametric methods have the necessity of technical specification as a requirement, which may mainly be restrictive. Nevertheless, DEA does not consider as a noise model, but it has the capability to impose axiomatic properties and then estimate the efficiency frontier non-parametrically, while SFA is not capable of imposing axiomatic properties, but has the advantage of inefficiency modelling and noise (Asmare & Begashaw, 2018).

More, based on the robustness of these methods in ranking productive units, DEA has the ability to enhance and improve the accuracy of parametric methods. Where the power of DEA technique lies on the flexibility of permitting the introduction of relevant issues (e.g., non-discretionary variables, categorical variables, or constrained multipliers, Murillo-Zamorano & Vega-Cervera, 2001). Respecting the consistency of the methods, parametric methods tend to be more stable and consistent more than nonparametric methods because the DEA technique tends to confound random disturbances with inefficiency due to its non-stochastic nature. Conversely, this nonparametric methodology offers guidance on how the inefficient production units could become efficient, utilising the concept of reference group of efficient DMUs that produce a comparable output. Ever since both methods have their own unique features, advantages, and disadvantages, the selection of an essential and suitable estimation method has been unclear and quite controversial.

**2.3.2.4 DEA mathematical derivation**

Several models have emerged to find efficiency indicators using the DEA method (Khodabakhshi, et al., 2011), most notably method is the constant returns to scale (CRS) model and the Variable returns to scale (VRS) model. In both models, efficiency indicators can be found, either from the input side and they are called input oriented models or from the output side, and they are called output oriented models (Cooper et al., 2004). However, before explaining the beforementioned models profoundly, researcher will explain the mathematical derivation of the DEA technique.

The mathematical formulation of the data envelope analysis, the efficiency can be calculated for  $n$  of organisation institutions that have one input and one output according to the following formula (Ramanathan, 2003; Sherman & Zhu, 2006):

$$\text{Efficiency} = \frac{\text{The actual output of the DMUs } j}{\text{The actual input of the DMUs } j}$$

To find the efficiency for a set of inputs and outputs, we assume that  $m_1$  represents the inputs and  $m_2$  represents the output, and the matrix of inputs and outputs will be as follow:

$$x_i = \begin{bmatrix} x_1^j \\ \dots \\ x_{m_1}^j \end{bmatrix}, y^j = \begin{bmatrix} y^j \\ \dots \\ y_{m_2} \end{bmatrix} : j = 1, 2 \dots n$$

Where  $x^j, y^j$  are the inputs and outputs for a specific DUMs, and  $\sigma_1, \dots, \sigma_{m_2}, \pi_1, \dots, \pi_{m_1}$ , represents the weights of inputs and outputs respectively. However, to calculate the efficiency for DMUs  $j^*$ , we use the following equation:

$$E = \frac{\sigma_1 y_1^{j^*} \dots + \sigma_{m_2} y_{m_2}^{j^*}}{\pi_1 x_1^{j^*} \dots + \pi_{m_1} x_{m_1}^{j^*}}$$

Efficiency using DEA can be calculated by dividing the ratio of the output to input. However, the measurement of relative efficiency stems from a concept developed by Farrell (*Bowlin*), which explains that a “*production frontier is a technology relationship that describes the maximum output produced by an efficient company from a combination of inputs in several periods*” (Nasution & Efendi, 2019). Nevertheless, Farrell’s (1957) efficiency ratio formulation is:

$$\text{Efficiency of DMU}_o = \frac{\sum_{i=1}^m u_{io}y_{io}}{\sum_{j=1}^n v_{jo}x_{jo}} \leq 1$$

Where:

- $O$  = DMU to be evaluated ( $o = 1, 2, \dots, N$ )
- $m$  = DMU<sub>*o*</sub> observed output
- $n$  = DMU<sub>*o*</sub> observed input
- $y_{io}$  = the amount of output *i* produced by DMU<sub>*o*</sub> ( $i = 1, 2, \dots, m$ )
- $x_{jo}$  = number of inputs *j* used by DMU<sub>*o*</sub> ( $j = 1, 2, \dots, n$ )
- $u_{io}$  = output weight *i* produced by DMU<sub>*o*</sub>
- $v_{jo}$  = input weight *j* used by DMU<sub>*o*</sub>

### 2.3.2.5 DEA Model Orientations

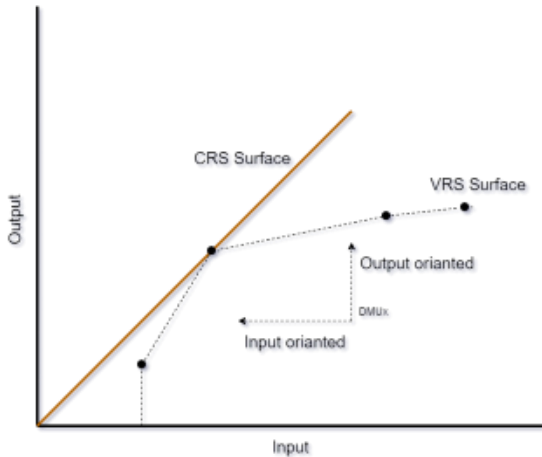
There are three types of model orientation. The first is input oriented measure that quantifies the input reduction, which is necessary to become efficient in holding the outputs constant. The second type of model orientation is the output-oriented measure which quantifies the expansion of output required holding the inputs constant. In contrast, the non-oriented measure quantifies necessary improvements when both inputs and outputs can be improved simultaneously (Cooper et al., 2007), as shown in the following Figure (2-22).

In applications, the choice of a particular measure mostly depends on three criteria (Cooper et al., 2004):

- The “primal” interpretation (e.g., the meaning of the efficiency score with respect to input and output quantities).
- The “dual” interpretation (e.g., the meaning of the efficiency score with respect to input and output prices).

- The “axiomatic” properties of the efficiency measure (e.g., monotonicity, unit’s invariance, indication of efficiency, continuity).

Figure 2-22: Input-Oriented Versus Output-Oriented



Source: our reproduction Zhu (2009)

### 2.3.3 DEA models

Currently, DEA has a variety of models ranging from classic models CRS (Charnes *et al.*, 1978), VRS (Banker *et al.*, 1984), additive (Charnes *et al.*, 1985) model, multiplicative model (Charnes *et al.*, 1982,1983), and its variations to approaches that combine DEA models with other techniques such as bootstrap (Coelli *et al.*, 2005) and fuzzy logic (Guo and Tanaka, 2001). However, the researcher will focus on the most used classic models in the following subsections.

#### 2.3.3.1 Constants Return Scale (CRS)

This model was developed by Charnes, Cooper, and Rhodes (Charnes *et al.*, 1978). To formulate this model, we assume a set of data ( $m_1$ ) from inputs and  $m_2$  from outputs for ( $n$ ) of DMUs. Where the ( $x^j$ ) symbolises the inputs matrix, ( $y^j$ ) symbolise the output matrix and  $j$  symbolise the DMU. The efficiency index is calculated for the institution ( $j^*$ ) using the input/output guidance model. The following

linear programming problem with input/output orientation is solved for the purpose of calculating the efficiency indicator according to the following table (Charnes et al., 1978):

Table 2-4: CCR DEA Model

Input orientation (CRS-I)	Output orientation (CRS-O)
$\max(\partial \cdot y^{j*})$	$\min(\pi \cdot x^{j*})$
s.t.	s.t.
$(\partial \cdot y^j) - (\pi \cdot x^j) \leq 0, j = 1 \dots n:$	$(\pi \cdot x^j) - (\partial \cdot y^j) \geq 0, j = 1 \dots n:$
$(\pi \cdot x^{j*}) = 1:$	$(\partial \cdot y^{j*}) = 1:$
$\pi, \partial \geq 0$	$\pi, \partial \geq 0.$

Using the theory of the opposite model (Duality) in linear programming, the two previous mathematical problems can be put in the following table:

Table 2-5: CCR DEA Duality Model

Input orientation (CRS-I)	Output orientation (CRS-O)
$\min \theta$	$\max \phi$
s.t.	s.t.
$\sum_j x^j \lambda_j - x^{j*} \theta \leq 0, j = 1 \dots, n:$	$\sum_j x^j \lambda_j \leq x^{j*}, j = 1 \dots n:$
$\sum_j y^j \lambda_j \geq y^{j*}:$	$\sum_j y^j \lambda_j - y^{j*} \phi \geq 0:$
$\lambda \geq 0$	$\lambda \geq 0.$

Where the vector ( $\lambda$ ) represents the units' weights, and  $F_i$  ( $\phi, \theta$ ) are the values of the efficiency indicators for the input and output routing model, respectively. The linear programming for the input orientation seeks to reduce the input vector of DUMs  $j^*$  ( $x^j$ ) proportionally to the minimum possible while maintaining the



achievement of the output level at  $(y^i)$  while the linear programming problem of the output direction model aims to maximise the output vector of DUMs  $(y^i)j^*$  while keeping the same input level.

**Table 2-6: CCR DEA Multiplier Model**

Envelopment / Primal Model	
Input-Oriented Envelopment model	Multiplier model
$\min \theta - \varepsilon \left( \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$ <p>subject to</p> $\sum_{j=1}^n x_{ij} \lambda_j + s_i^- = \theta x_{io} \quad i = 1, 2, \dots, m$ $\sum_{j=1}^n y_{rj} \lambda_j - s_r^+ = y_{ro} \quad r = 1, 2, \dots, s$ $\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$	$\max z = \sum_{r=1}^s \mu_r y_{ro}$ <p>subject to</p> $\sum_{r=1}^s \mu_r y_{rj} - \sum_{i=1}^m v_i x_{ij} \leq 0$ $\sum_{i=1}^m v_i x_{io} = 1$ $\mu_r, v_i \geq \varepsilon > 0$
Output-Oriented Envelopment model	Multiplier model
$\max \phi + \varepsilon \left( \sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$ <p>subject to</p> $\sum_{j=1}^n v_i x_{ij} \lambda_j + s_i^- = x_{io} \quad i = 1, 2, \dots, m;$ $\sum_{j=1}^n v_i y_{rj} \lambda_j - s_r^+ = \phi y_{ro} \quad r = 1, 2, \dots, s;$ $\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$	$\min q = \sum_{i=1}^m v_i x_{io}$ <p>subject to</p> $\sum_{i=1}^m v_i x_{ij} - \sum_{r=1}^s \mu_r y_{rj} \geq 0$ $\sum_{r=1}^s \mu_r y_{ro} = 1$ $\mu_r, v_i \geq \varepsilon > 0$

**2.3.3.2 Variable return on scale (VRS) model**

This model was developed by Banker, Charnes, and Cooper (BCC) in 1984, and it differs from its predecessor (CCR) model in terms of



depending in the variable return scale, which means the operational processes of DUMs can be at the level of increasing, constant or decreasing return scale. Thus, this model distinguishes between two types of efficiency, namely, technical efficiency and scale efficiency. Hence, it measures the percentage of increase in outputs with an increase in inputs, is the percentage increase in output greater than the percentage increase in inputs and this is what is called Variable return scale, and in another case, the degree of increase in output is like the degree of increase in input, which is the constant yield of volume (Banker *et al.*, 1984). The model is similar to the previous model (CCR) except for the addition of a separate variable ( $\varepsilon$ ) so that the characteristic of variable yields for the DUMs can be known. The mathematical formula with input/output direction can be written according to the following table (Banker *et al.*, 1984):

Table 2-7: Input orientation BCC DEA Model

Input orientation (BCC-I)	Output orientation (BCC-O)
$\max(\theta \cdot y^{j*}) + \varepsilon$	$\min(\pi \cdot x^{j*}) + \varepsilon$
s.t.	s.t.
$(\theta \cdot y^j) - (\pi \cdot x^j) + \varepsilon \leq 0, j = 1 \dots n$	$(\pi \cdot x^j) - (\theta \cdot y^j) + \varepsilon \geq 0, j = 1 \dots n:$
$(\pi \cdot x^{j*}) = 1:$	$(\theta \cdot y^{j*}) = 1:$
$\pi, \theta \geq 0$	$\pi, \theta \geq 0$

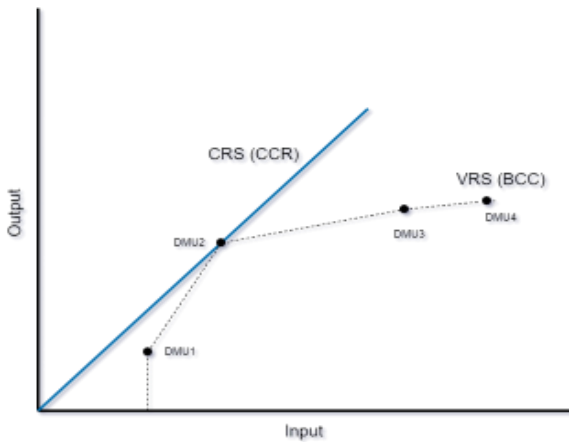
The linear programming model with input/output direction can be written according to the following (Banker *et al.*, 1984):

**Table 2-8: BCC Duality DEA Model**

Input orientation (BCC-I)	Output orientation (BCC-O)
$\min \theta$ $\text{s.t.}$ $\sum_j x^j \lambda_j - x^{j^*} \leq 0, j = 1 \dots, n:$ $\sum_j y^j \lambda_j \geq y^{j^*}:$ $\sum_j \lambda_j = 1:$ $\lambda \geq 0.$	$\max \phi$ $\text{s.t.}$ $\sum_j x^j y_j \leq x^j, j = 1 \dots n$ $\sum_j y^j y_j - y^{j^*} \phi \geq 0:$ $y_j \geq 0.$

To clarify the typical concept of (CCR) and (BCC) and their optimum limits, we assume the existence of a productivity function consisting of one input and one output and four DUMs DUM1, DUM2, DUM3, and DUM4, as in the following Figure (2-23).

**Figure 2-23: input-Orientation Versus Output-Orientation**



*Source: designed by researcher based on thy study of Coelli, et al. (2005)*

From the observation of Figure (2-23), we find that DUMs 1, 2, 3, and 4 are technically efficient because they lie on the efficient frontier curve, but they are not equal in terms of productivity. Here the effect of

size emerges. For example, we find that DUM1 did not reach its optimum level of output and can increase the volume of its operation to reach DUM2. As for DUM4, it operates in the case of decreasing capacity and getting greater productivity. It must reduce the volume of its operations until it reaches DUM2, which operates at the best production level.

Additionally, it is clear that the number of efficient DUMs according to the CCR model is less than the number of efficient DUMs according to the BCC model. In the CCR model, we find that DUM2 is the only efficient DMU, while DUM1,2,3 and 4 are efficient DUMs according to the BCC model. The reason for this is that the CCR model does not take into account the effect of size (Size Effect) as it treats all the DUMs as they have fixed size, while the BCC model handles the impact of size.

One of the necessary things that must be known is whether the reason for the lack of (Scale efficiency) in volumetric inefficient units is yield to the poor internal processes in the DUMs, or is the reason the external conditions surrounding the DUMs, so, the efficiency value resulting from the BCC model is called (Local Pure Technical Efficiency), while the efficiency value of the CCR model is called (Global pure Technical Efficiency), so the (Scale Efficiency) is the result of dividing the technical efficiency according to the CCR by the technical efficiency according to the BCC.

On this basis, if the scale efficiency is equal to one, that means the efficiency in both models (BCC and CCR) is one, then this means that the DUMs that operates at the maximum possible size (Most Productive Scale Size). However, if the efficiency using the CCR model is less than one, and the efficiency using the BCC model equals one, then the scale efficiency is less than one. That means that the reason for inefficiency is not yielded to the internal processes of the DUMs, but it is due to the external conditions surrounding them (DUMs), but if the scale efficiency is less than one and the efficiency of the BCC model is less than one as well, this means that the inefficiency is due to the internal processes as well as the surrounding external conditions.

### 2.3.3.3 Additive model

Charnes et al. (1985) and the extended additive model (Charnes et al., 1987) - Relate DEA to earlier Charnes-Cooper (1959) inefficiency analysis and in the process. - Relate the efficiency results to the economic concept of Pareto optimality

This model is called additive for the reason that it combines the two aspects of the input and output orientation, where this model utilises the approach “goal vector” of Thrall (1996). In other words, these models simultaneously maximise outputs and minimise inputs, in the sense of vector optimisations (Cooper, Seiford & Zhu, 2011). This model is of the type of maximisation, as this model works to maximise the sum of stagnant variables (Slack) or (goal weights) and the (Surpluses). However, the mathematical formula of this model is as follows:

$$\begin{aligned}
 & \max(e.S^+) + (e.S^-) \\
 & \text{s.t} \\
 & \sum_j x^j \lambda^j + \text{Im}_1 S^+ = x^{j*} \\
 & \sum_j y^j \lambda^j - \text{Im}_2 S^- = y^{j*} \\
 & \sum_j \lambda^j = 1 \\
 & \lambda, S^+, S^- \geq 0.
 \end{aligned}$$

The models may determine an efficient frontier that may be piecewise linear, piecewise log-linear, or piecewise Cobb-Douglas (Charnes, et al., 1994).

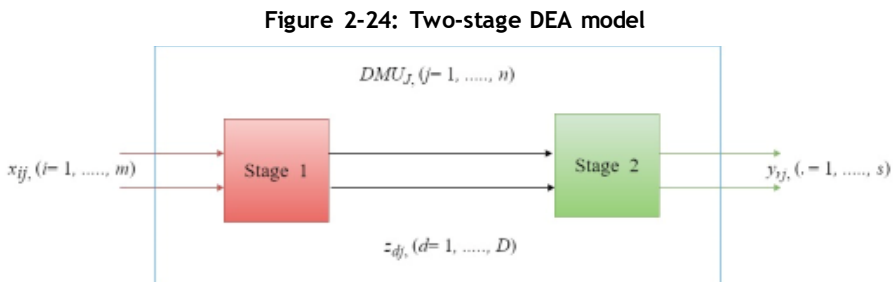
### 2.3.3.4 Two-Stage DEA

Data envelope analysis (DEA), as defined by its discoverers, is the use of linear programming to measure the efficiency of identical units, which uses a set of inputs to produce a set of outputs (Cooper et al., 1978). In this case, the decision-making units (DMUs) are seen as having their productive activity in one stage; that is, they use their inputs to obtain final outputs that are thrown into their external environment. In many cases, the matter is opposite to the previous

point, where there are units whose production processes are carried out in more than one stage, and any stage is in relation to the previous stage.

To address such cases, a new model has been developed, called the two-stage data envelope analysis model, which is a tool for measuring the efficiency of units that use in a first stage a set of inputs to produce a set of outputs, and then in a second stage, the outputs of the first stage are used on the basis that they are inputs to the second stage to get a second other outputs (Wang & Chin, 2010). The output which becomes the input of another stage is called Intermediate Measures (Despotis & Koronakos, 2014). Färe Rolf and Chawna Grosskopf were the first to address the idea of intermediate outputs in their work entitled: “*Productivity and intermediate products: A frontier approach*”, published in Economics Letters magazine in 1996 (Färe & Grosskopf, 1996).

To further clarify the idea of a two-stage productivity estimation via DEA process, we suppose that there are  $n$  of decision-making units  $DMU_j$ , using in the first stage  $m$  of inputs expressed as  $x_{ij}$  ( $i=1,2,\dots,n$ ) to produce  $D$  of outputs, expressed as  $z_{dj}$  ( $d=1, \dots, D$ ), in the second stage the outputs  $z_{dj}$  are used on the basis that they are the inputs of the second stage in order to obtain the final outputs expressed as  $y_{rj}$  ( $r=1,2, \dots, s$ ).



Source: designed by researcher based on thy study of Chen, et al. (2011)

From the previous Figure (2-23) it is clear that the outputs  $z_{dj}$  mediate the first stage and the second stage, so it is called in intermediate measure. It refers to the efficiency in the first stage as  $e_j^1$

and in the second stage as  $e_j^2$ , and their formulas are given as follows (Cook, et al., 2010):

$$e_j^1 = \frac{\sum_{d=1}^D w_d z_{dj}}{\sum_{i=1}^m v_i x_{ij}}$$

$$e_j^2 = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{d=1}^D \tilde{w}_d z_{dj}}$$

Where  $\tilde{w}_d \cdot w_d \cdot v_i \cdot u_r$  expresses unknown and non-negative weights (Cook, et al., 2010).

Since the emergence of the idea of multiple production stages for decision-making units, many mathematical models have been proposed that allow calculating the efficiency of units taking into account their internal structures. Because of the large number of these models, some researchers tried to classify them into different groups. Among the most prominent of these is the one provided by Cook, et al. (2010). According to them, each two-stage efficiency study model can fall under one of the following four groups: (1) Standard Data Envelope Analysis Group, (2) Efficiency decomposition Data Envelope Analysis Group, (3) Game theory-based (Game-Theoretic) Data Envelope Analysis Group, and (4) Networked Data Envelope Analysis Group Cook, et al. (2010).

Within the same context, other researchers had another classification, for instance, the classifications of Halkos, et al. (2014) had four groups, and they were as such: (1) Independent Two-Stage Data Envelopment Analysis models, (2) Continuous Two-Stage data Envelope Analysis models, (3) Relational two-stage Data Envelope Analysis models, and (4) Game Theory-based Data Envelope Analysis models. Also, the classification of Castelli et al. (2010) was as follows: (1) Elementary model, (2) Shared flow models, (3) Multilevel models, and (4) Network models. The most recent classification made by Kao (2014) is based on the type of structure of the stages within the DMUs. According to it, the models can be classified into five primary groups, which are: (1) Basic two-stage structure DEA, (2) General two-stage structure, (3) Series structure DEA model, (4) Parallel structure DEA model, (5) Mixed structure DEA model, (6) Hierarchical structure DEA model, (7) Dynamic structure DEA model.

To conclude this section, the literature identifies that the standard single-stage DEA method to evaluate efficiency is such a great and valuable tool. However, it has a limitation when it comes to evaluating more complex systems, with more than just a simple input-output procedure, for the reason it fails to address the internal structures. In this regard, in order to give decision-makers a more precise idea to monitor the overall individual procedures within any unit, those leaders need a tool that can integrate these interrelations into a model (Halkos, et al., 2014).

#### **2.3.4 Strengths and limitations**

As previously discussed, in section (3.3.2.3) the methods of measuring efficiency are classified into two groups, the first is parametric methods, and the second is nonparametric. The first requires a prior functional characterisation before estimating the model and extracting the boundary efficiency curve. As for the second method, it does not need a prior characterisation, but the efficiency is calculated directly from the observations. The data envelope analysis (DEA) falls within the nonparametric methods, and it's like any other technique, where it has its strengths and limitations.

Studies including (Charnes et al., 1994; Cooper, et al., 2000; Odeck & Alkadi, 2001; Barros & Peypoch, 2010; Kopsakangas-Savolainen, 2010; Berg, 2010; Jordá, et al., 2012; Zbranek, 2013; Al-Rashidi, 2016; Zare, 2017; Javid, 2018; Najadat *et al.*, 2018), have unanimously agreed on a set of strengths and limitations of this technique, most notably that it is as shows in the next table:



**Table 2-9: DEA strengths and limitations**

DEA's Strengths	DEAS's Limitations
1- The nonparametric methods were mainly concentrated in DEA models, which is a linear programming model applied to data observations, which gives a way to create an efficiency curve, which envelope all observations, in addition to that this model calculates an efficiency indicator for each unit or observation relative to the other units.	1- Since the method of DEA is an extreme point technique, noise (even symmetrical noise with zero mean) can cause significant problems, as can measurement errors.
2- One of the major advantages of DEA over other methods that determine efficiencies, such as cost-benefit analysis or regression, is that the relative weights of the variables do not need to be known in advance.	2- DEA is a good estimator of the "relative efficiency" of any DMU, but it converges very slowly to "absolute" efficiency. Simply put, it can tell us how well we are doing compared to our peers, but not compared to a theoretical maximum.
3- DEA method can cope with multiple input and output models.	3- Large problems can be computationally intensive since a standard formulation of DEA produces a separate linear program for each DMU.
4- It does not require an assumption of a functional form relating inputs to outputs because it is a nonparametric approach.	4- The DEA method assigns mathematically optimal weights to all inputs and outputs being considered. It empirically derives the weights, so the maximum weight is placed on those favourable variables, and the minimum weight is placed on the unfavourable variables.
5- DMUs are directly compared alongside a peer or a combination of comparable peers.	5- The underlying assumption of this method is that it is equally acceptable to specialise in producing any output or consuming any input (Charnes et al.,1994).
6- Inputs and outputs can be completely different units.	6- Results are sensitive to the selection of inputs and outputs.
7- As pointed out in Cooper et al. (2000), DEA has also been used to supply new insights into activities (and entities) that have previously been evaluated by other methods.	7- The values with high efficiency can be obtained by being efficient
8- Accepted to be very effective in discovering relationships that remain hidden for other	

DEA's Strengths	DEAS's Limitations
methodologies (Berg, 2010).	or having the right combination of DMUs (inputs/outputs).
9- Able to be used with any measure of input and output, although ordinal variables remain difficult sources of inefficiencies can be analysed and quantified for each unit evaluated.	8- The number of effective firms on the frontier increases with the number of input and output variables.
10- The DEA method is easy to use compared to the random cost limit method, and therefore it is widely used, especially in efficiency analysis.	9- DMU efficiency scores can be obtained using non-unique combinations of weights on the input and/or output factors.
11- The simplicity of dealing with a large number of inputs and outputs.	10- Since the DEA method adopts the concept of weights for each unit when maximising its relative efficiency, this may be one of the negatives, the institution may appear efficient according to the concept of relative efficiency, but in reality, it is not, and this appears when the number of institutions involved in the evaluation is few, and the number of outputs is large (Kopsakangas-Savolainen, 2010).
12- It is not affected by the different units of measurement.	11- One of the most important criticisms of the DEA method is the inability of this technique to distinguish between a case of inefficiency and a statistical error; and the sensitivity to the number of variables entering the model, where the greater the number of input variables, the greater the number of efficient units.
13- The (DEA) model gives large value measures that cannot be manipulated.	
14- Flexibility in data processing, whether historical or future (simulated) data.	
15- Ease of merging between inputs and outputs and calculating technical efficiency, because it requires information on the quantities of inputs and outputs without prices, which makes it very suitable for analysing the efficiency of human service providers, for example.	
16- A technique by which performance is evaluated by unifying the different points of view on the performance of the facility or organisational unit in a way that provides a better understanding of it using	

DEA's Strengths	DEAS's Limitations
<p>mathematical programming modelling.</p> <p>17- A methodology for estimating the maximum level of outputs that result from the inputs or the minimum levels of inputs for specific output levels is characterised by its ability to deal with the collected information instead of the detailed information. Therefore, this methodology is seen as an appropriate starting point for determining balanced performance.</p> <p>18- A decision-making technique used in organisational performance analysis in the public and private sectors, and it has recently been shown to be highly effective in the health sector and hospitals.</p>	

To end with, [Tan, Zhang and Khodaverdi \(2017\)](#) believe that this technique can help the management accountant and organisations' decision-makers to measure changes in productivity and continuous improvement in organisational performance, as it can be combined with the balanced scorecard to reflect the strategy of the organisation in order to provide a balanced view of organisational performance. It is also characterised by calibration and transparency and allows analysis of a relatively large number of inputs and outputs measured at various levels, as well as allows the inclusion of qualitative data as observations on the extent of satisfaction of stakeholders, which is necessary to establish the reference criteria for evaluating the balanced scorecard. It is worth noting that it is also objective because its results help in weighting the required levels for improvement in a way that frees the analysis from self and random assessments that may waste resources and time ([Lacko, Hajduová & Gábor, 2017](#)).

### 2.3.5 DEA fields of application

After the introduction of [Charnas et al. \(1978\)](#) of the technique of DEA in the literature, it has been emerging exponentially since then; as a management tool that can evaluate the performance and measure it for many types of organisations within different contexts around the globe ([Charles & Kumar, 2013](#)). Ever since this emergence, the application of DEA has become noticeable in almost every field (i.e., health sector, e-Government; public policy, agriculture, tourism, economy, education, human resources, insurance, services, information technology, benchmarking, banking, environment, medicine, operation, marketing, regulation, etc., [Ersoy, \(2021\)](#)). Furthermore, it has been stated that DEA attracted both researchers and practitioners for the development of its methodology and the wide range of applicability in evaluating the performance of public and private organisations ([Banker et al., 2013, June](#)). The studies carried out using the DEA method in different sectors have been given in the following paragraphs.

In the banking field, which attracted the many authors' attention (e.g., [Nhan et al., 2021](#); [Vital et al., 2021](#); [Amin & Ibn Boamah, 2021](#)), this method was used extensively in measuring the efficiency of banks due to the importance of this field to the national economy, especially since banking crises required attention to these two roles to face financial crises ([Ferreira, 2020](#)). It also determines the amount and source of waste energy from the resources consumed by the least efficient units and how resources are allocated (e.g., [Albores et al., 2016](#)). In the field of the insurance industry, a study to evaluate the performance of 15 Indian general insurance companies had been carried out using a two-stage DEA technique for the time between 2009-2010 ([Sinha, 2021](#)). In the field of the textile industry, the technical efficiency of Indian textile industry for the period between 1995–2016 has been assessed using DEA ([De & Ghose, 2021](#)).

In the field of tourism, [Fuxia & Bizhe \(2022\)](#) assessed the efficiency of ecological tourism resources for the period between 2005–2017 in China- Hunan Province. In the field of benchmarking management ([Ripoll Zarraga et al., 2021](#); [Van Puyenbroeck et al., 2021](#); [Ge, 2022](#)), environmental efficiency ([Romero-Ania, 2022](#)), in the field of Information and Communications Technology (ICT), and especially

the efficient services of E-Administration and E-Government (Alegre, 2018; Nam et al., 2022), and in the field of high education (Kaur, 2021).

Nevertheless, in the health sector, even with its vast categorisation, DEA has been noticeably present. Where it has been used extensively to evaluate the efficiency of public sector hospitals (e.g., Samsudin et al., 2016; Campanella et al., 2017; de Almeida Botega et al., 2020; Cinaroglu, 2021), private sector hospitals (e.g., Chitnis & Mishra, 2019; Mohanta et al., 2021), research and universities hospitals (e.g., Bağci & Konca, 2021), primary care health centre and Health Post (e.g., Ramalho, et al., 2021; Pereira et al., 2021; Yitbarek et al., 2021), clinics (e.g., ), medical procedures such as evaluating the efficiency of kidney transplantation processes (Arteaga et al., 2021), the efficiency of surgical services (e.g., Girginer, et al., 2015 ), and acute hospitals (e.g., Fuentes, et al., 2019).

Given the fact that this study is conducted in the public healthcare sector and, more precisely, in the Jordanian public hospitals, researcher will focus and demonstrate more extensively in the next sections the nature of performance using DEA within hospitals industry.

### **2.3.6 Performance measurement and DEA in health organisations**

The hospital is a service organisation responsible for providing integrated health services, diagnostic as curative, as general as research. Like the hospital as a management system, it uses human resources as technical, as well as material and luxury, whose volumes increase in terms of value, which coincide with technical progress such as health.

The demand for health services increases due to multiple factors, the most important of which are the war and its effects, the increase in the number of the population, the increase in road accidents and occupancy rates, industrial accidents, refugees, pandemics, and others. In agreement with that, the hospital administration and its workers are reluctant to provide health services with outstanding quality. The quality of health services is a very important element in the field of hospital management, as it is linked to the most important aspect of human life, which is health.

The process of measuring efficiency in sectors such as industry, agriculture and commerce seems to be ambiguous, and then it is possible to calculate what is known as technical and relative efficiency. Nonetheless, in the services sector, it is difficult to measure technical efficiency for the difficulty to measure the inputs and outputs quantitatively, in addition to the difference in outputs from inputs in their nature and quality as is the case in the healthcare and health services sector or in the education sector.

The healthcare services sector has become one of the world's biggest, most expensive, complex and quickest developing industries as it frames an enormous aspect of a nation's economy (Smith, 2009; Shukri & Ramli, 2015). Both public and private healthcare organisations need to manage an unsteady situation because of different conditions, such as quick change of innovation, demographic factor and change in ways of life (Koumpouros, 2013).

The healthcare sector and hospitals, in contrast with other sectors, is an interesting domain with numerous particular difficulties that make service quality a high target in any organisation whose focus is a conveyance of competitive services and satisfying its customers (Ali *et al.*, 2013). A portion of the difficulties confronting the healthcare division organisations incorporate constant deficiency of staff. There is expanded worry about the nature of care in the healthcare segment, and patients are getting additional requests for specific care. The medical job is likewise raising worries about the expense of prescription and the dangers of advancing microorganisms. In this manner, for healthcare organisations to moderate these difficulties, quality and cost must be at the centre of the measurement of their operational and organisational performance (Karanja, 2016).

As indicated by Hashmi, Amirah and Yusof (2020b), medical services performance is a vital substance as it includes the clinicians, patients, more extensive public, and the legislature. Further, the performance of medical care altogether differs from other traditional governmental services (Fatima, Malik & Shabbir, 2018). Simultaneously, public medical services and hospitals are autonomous in administrative issues to act unqualified similarity on the stake of public health (Hashmi *et al.*, 2020). Furthermore, public medical care

centres and hospitals, for the most part, are criticised and asserted for low responsibility, maladministration, and abuse of assets (Hashmi, Amirah & Yusof, 2020b).

Noteworthy issues that public hospitals face include difficulties in meeting patient satisfaction (Silow-Carroll, 2008), effectively maintaining their operations and improving financial accountability due to the great pressure on this sector (Deloitte, 2014). The complex operations and different patient conditions have caused long waiting times for patients in public hospitals, which leads to patient dissatisfaction and increased patient complaints about hospital services, and negatively affects hospital performance (Yuen & Ng, 2012). It was indicated by Gurd and Gao (2008) that patient satisfaction is a comprehensive indicator of the hospital's internal performance and service towards their clients, which consequently affects the patient's loyalty and hospitals' survival in a competitive environment. Thus, Shukri and Ramli (2015) emphasised the need for better hospital performance measurement.

From a public administration viewpoint, performance is oftentimes seen as a valued commitment to arrive at the objectives of a firm. Commitments to performance can be made by an individual or a group of workers just as by outer gatherings. Nevertheless, performance with regards to healthcare contrasted a lot as the objectives of healthcare services facilities and centres regularly are not obviously characterised, and the value of medical care administration conveyance is hard to apportion. Thus, literature regarding performance management of hospitals and healthcare centres tends in general to utilise the three E's – *efficiency*, *economy* and *effectiveness* – to characterise performance for the non-revenue driven organisations, including hospitals and other healthcare facilities (Cleven, *et al.*, 2016).

While examining healthcare organisations and hospitals, it is important to consider that they are complex adaptive frameworks (McDaniel *et al.* 2009), and, since the 1960s, complexity has been a focal construct taken into consideration by organisation researchers. There are numerous manners by which this multifaceted nature can show itself; however, regardless of whether the idea of complexity thrives in the public area, the utilisation of this complexity is neither

undeniable nor as clear as it would show up ([Arnaboldi \*et al.\* 2015](#)). For the particular case of health care organisations, the complexity depends on the dynamic nature of this sector, which unfolds in unusual ways; these unfolding occasions are regularly extraordinary, and it is fascinating that various complexity theory advocates have recognised the healthcare sector as a reasonable setting for study. This complexity is additionally reflected in the manner organisational performance might be characterised and estimated. Actually, this theory of complexity has rich ramifications for the strategic administration of organisations. Understanding this complexity to improve collaborations among business units may improve organisational performance ([Spano & Aroni, 2018](#)).

On account of this complex nature, measuring performance in the medical care sector was uncommon in the past decades. Truth be told, it was believed that performance was not quantifiable. In any case, today, there is a higher enthusiasm for measuring and evaluating performance in the healthcare sector, and sometimes there is the issue of having an excessive number of measures, some of which concentrates on outcomes, processes and outputs, and others on single activities that have restricted impact on overall health ([Cassel \*et al.\* 2014](#)).

Healthcare performance consequently must be seen as a multidimensional phenomenon, where the financial, separately value point of view (economy) is just one dimension of the overall. It is additionally important to consider patient-related perspectives (effectiveness) and knowledge and related procedural perspectives (efficiency) ([Cleven \*et al.\*, 2016](#)). Accordingly, potential zones where performance in medical care and hospitals can be estimated are ([Cleven \*et al.\*, 2016](#)):

- Healthcare financial quality (economy): Revenue enhancement, profitability improvement, smoothing out cases handling, waste and cost control, action-based costing.
- Healthcare innovation and operations (economy): Quality and innovation the executives and measurements, deftness improvement, joint collaboration opportunities, working capital and resource management.



- Healthcare individuals' advancement (efficiency): Provider experience estimation, supplier dependability and the voice of the supplier investigation, growth and learning measures, innovation, culture, knowledge, and immaterial value examination.
- Patient satisfaction and service (effectiveness): Including patient commitment, experience, loyalty, and delight and relationship estimation, just as the most significant of all estimating and following the voice of the patient.
- Healthcare marketing (effectiveness): Measuring and building up the growing significance of medical services branding, notoriety and trust management, client/patient division, patient life-time rate and profitability.

However, it was indicated by the [OECD \(2005\)](#) that key areas ought to be pinpointed as components of centre differentiation for healthcare organisations from profit business situated organisations. Performance, albeit characterised in unequivocal objectives that must be met, must incorporate a quality report, as it is not only a target evaluation of numbers yet incorporates decisions of significant value and quality with respect to the end clients of the administration – the patients.

With respect to healthcare and hospital performance measures, [Berg et al. \(2005\)](#) recognised external and internal measures for performance, contingent upon whom they were essential to the medical care unit (inside measures – reflecting monetary performance, proficiency and so forth.) or the external authorities and public (outside measures, identified with the nature of the provided administrations and services). [Caiado and Neto \(2013\)](#) proposed, as reasonable measures, the quantities of re-affirmations five days after the finish of treatment as an intermediary for quality, admittance to administrations, and financial performance. [Amado and Santos \(2009\)](#) utilised the same measures, which they classified under labels, for example, efficiency, cost-effectiveness, service effectiveness and equity of access.

Several investigations have utilised reasonable structures and models to assess in building effective organisational performance apparatuses for the medical care sector. For instance, [Arah et al. \(2006\)](#) proposed a measurement system in which they present some common

key performance measurements for medical services organisations. In building this system, (Arah *et al.* 2006) considered different past models and frameworks as well as organisational performance systems utilised by a few locales (USA, Canada, UK, Australia, World Health Organization (WHO), OECD and European Community) and made a list of healthcare performance measurements including *safety, equity responsiveness, appropriateness, efficiency, effectiveness, patient-centeredness, acceptability, accessibility and timeliness*. A portion of these measurements is steady with the measurements required by the general facilities of the healthcare sector around the world, regardless of whether characterised in an alternate way.

Baraldi and Bocci (2009) analysed the most widely recognised methodologies for measuring the organisational performance of Italian medical services organisations. Specifically, they studied how Italian medical care organisations measure their performance and clarified the expanded significance of the balanced scorecard that has been adjusted to the highlights of the medical services area. Indeed, despite the fact that financial indicators are as yet utilised—as in profit arranged organisations—numerous nonfinancial indicators have become the overwhelming focus, and the balanced scorecard is helpful to measure both budgetary and nonfinancial performance in medical services organisations (Nutti *et al.* 2013).

A later report proposed another model for estimating and assessing medical services organisations' organisational performance utilising two principle measurements: result and conveyance proficiency. The model depends on a performance evaluation matrix (Clegg *et al.* 2013) and incorporates 42 indicators, 24 concerning results, 18 on conveyance proficiency, and an extra part identified with the management.

European Foundation for Quality Management (EFQM) is a notable model for measuring organisational performance in organisations. It has been applied for performance assessment in numerous examinations. For example, Tabibi *et al.* (2009) assessed the performance of *Ayatollah Kashani Medical Clinic* dependent on the EFQM Excellence Model. EFQM model is made out of two sections, the rules for the assessment process and standards for assessment of results. In another examination, the performance of the Hashemi Nejad

emergency clinic has been measured dependent on Malcolm Baldrige investigation models (Fatehpanah, Gouhari & Maleki, 2009). Sajadi *et al.* (2008) started to self-assess the performance of emergency clinics and instructive clinical focuses in *Isfahan University of Medical Sciences*. In their investigation, the principal goals were self-measurement dependent on the excellence model. In the primary stage, they endeavoured to comprehend the present status of the organisation and decide its qualities and shortcomings and afterwards, they attempted to strengthen the qualities, take out imperfections and improve the organisation performance. Be that as it may, the discoveries of this examination neglected to decide the qualities and shortcomings of the medical centre under investigation and fill in as a guide for dynamic and overseeing approaches.

Zelman *et al.* (2003) utilised the balanced scorecard to assess the performance of medical clinics in China. They found that the utilisation of the Balanced Scorecard (BSC) strategy was powerful in recognising the issues and hindrances so as to improve treatment administrations. Bruce and Tian (2008) applied the BSC to assess the performance of medical services organisations. In their investigation, the utilisation of this strategy was discovered to be useful in introducing the nature of the current conditions, just as giving suitable methodologies to improve the quality.

Furthermore, Hatefi and Haeri (2019) assess the productivity of emergency clinics by a hybrid model of balanced scorecard-fuzzy data envelopment analysis (BSC-fuzzy DEA). The utilisation of BSC measures in four viewpoints of the client, internal processes, growth and financial, and advancement mirrors the general vital targets of the medical clinics in the organisational performance evaluation measure. It was also shown that applying the BSC and fuzzy DEA strategies gives a complete performance appraisal instrument for hospital and healthcare clinics and cause chiefs and decision-makers to get more exact planning to save the assets and extend the limit of healthcare services.

With respect to explanations behind measuring performance in the health care sector, as per De Vos *et al.* (2009), experts use measurements for various purposes, i.e., assessing, controlling, and improving clinical

practice. Despite the fact that there is little proof that performance measures are really utilised by professionals to enhance performance, [Clegg \*et al.\* \(2013\)](#) propose that performance might be an adaptable strategy for driving improvement in medical services organisations. Actually, performance is perceived as a technique with numerous use prospects in medical services ([Clegg \*et al.\*, 2013](#)). For instance, actualising a straightforward and transparent medical care framework is viewed as an approach to make out the pressure and a need to keep moving for change ([Clegg \*et al.\*, 2013](#)). [Van der Wees \*et al.\* \(2014\)](#) propose that performance measures are utilised by clinicians to assess the manner in which they communicate with patients and to gauge quality improvement inside their organisations; additionally, these measures might be utilised by health insurance organisations to compare the performance of various suppliers. Moreover, the performance information may facilitate patients' choices in picking a healthcare provider.

#### **2.3.4.1 DEA application to the health organisations**

In the healthcare sector and especially hospitals, DEA has been used extensively to analyse and evaluate healthcare services and performance. As a matter of fact, DEA has been used extensively in evaluating healthcare organisations all around the world. Although there are many methods used to assess healthcare efficiency, DEA is the most widely used and adopted approach ([Najadat \*et al.\*, 2018](#)).

The first application of DEA in the healthcare sector dates back to the work of [Nunamaker \(1983\)](#), as reported by a study by [Zare \(2017\)](#). Since then, the DEA has been used extensively to achieve technical competence and evaluate the organisational performance of the Public Health Organization in the United States and other parts of the world ([Zare, 2017](#)). Also, [Sherman \(1984\)](#) was the first researcher to apply DEA to evaluate the technical competence of the public health organisation in the United States, according to an analysis of the organisational performance factors of hospitals represented in daybed, budget, number of full-time doctors, patients over the age of 65 years, and patients aged below 65 years, and male and female nurses as well

as trainees as inputs and outputs, and through this analysis tool, convincing and sound results were obtained.

Since [Sherman's \(1984\)](#) study to the present day, this DEA model has been used extensively in the healthcare sector, as it is the most efficient model in evaluating this sector according to financial criteria. Although the health sector mainly aims to maximise results in relation to patients' health, doing so at the lowest possible cost is not only desirable but also required by the health care law, which has prompted many researchers to use this mode ([Zare, 2017](#)).

For instance, [Ramírez-Valdivia et al. \(2015\)](#) assessed the technical efficiency of essential medical care centres and hospitals in Chile. They utilised information gathered from 259 Chilean regions; 82 in the metropolitan gathering and 177 in the rustic gathering. Their information crossed the time from 2006 and 2008. The utilisation of the DEA approaches in their study analysis gave great and supportive outcomes in ordering the regions of this country where some territories are discovered to be productive while others are discovered to be non-effective; henceforth, ensuing advances and cures should be taken by medical care authorities.

Furthermore, [Abbas et al. \(2011\)](#) utilised the DEA to compute the specialised effectiveness of Basic Health Units (BHUs) in Sargodha with the selection of sources of outputs and inputs being explicit to BHUs activity. In their work, they utilised the information of 116 fundamental BHUs in the locale Sargodha for the year 2010. Information used to be dealt with by the Statistical division of the medical care centre. Four inputs and four outputs were utilised to assess the proficiency of the BHUs. Input factors are Number of Para-clinical staff, Number of Medical staff, Number of other staff and Number of Lady Health Workers, while, Number of Children vaccinated, Number of outdoor patients, Number of First Antenatal consideration visits and Number of Family Planning Visits are output factors. DEA model outcomes uncovered that 76% BHUs were wasteful and destructing the foundation. The general discoveries were reliable with the researchers' expectation that the public healthcare administrations conveyance system in developing nations is inefficient. Henceforth, governments

ought to dispense more assets on the healthcare sector to improve its crushed infrastructure.

[Kawaguchi \*et al.\* \(2014\)](#) estimated the efficiency of Japan's 112 municipal clinics subsequent to actualising the medical services reform in 2007~2009. This investigation applied a powerful organisation DEA (DNDEA) model. [Tigga and Mishra \(2015\)](#) applied the conventional DEA model to assess the medical services frameworks' effectiveness, and they are accepting India's 27 states as DMUs. [Samut and Cafri \(2016\)](#) estimated hospitals' efficiencies in 29 OECD nations by utilising the DEA technique and analysed condition components' effects on productivity scores by utilising Panel Tobit Analysis. All these studies showed the possibility of improving the technical competence of the hospital's understudy and that countries should put more resources to support this sector.

While several preferences of utilising DEA to measure and evaluate the performance of medical care centres and hospitals have been cited in these investigations, including its handiness as a benchmarking instrument in distinguishing proficient and inefficient medical care centres, its utility as far as policy strategy choices are restricted. This is because of the powerlessness of this procedure to recognise the basic reasons for shortcomings ([Seitio-Kgokgwe \*et al.\*, 2014](#)).

Given the lack of consensus on the best methodologies for evaluating hospitals performance and the proven efficacy and flexibility of the DEA method for evaluating the effectiveness and performance of hospitals in the previous studies mentioned above, this method will be used in this study.

#### **2.4 PRIOR AND RELATED STUDIES (*THE STATE OF ART*)**

There are many studies that have dealt with the topic of PSM, ethical behavior, and organizational performance using DEA respectively, from a different angle, and these studies have varied from different countries around the world. Where the researcher reviewed a set of studies that have been used with reference to their most prominent features. With a comment on it that includes aspects of agreement and disagreement, and an indication of the scientific gap that is addressed by the current study. The researcher would like to point out that the

studies that were reviewed came in the time-space between 2010 and 2021, and included several countries and different populations, indicating their temporal, geographical, and study sittings diversity.

In this part of the literature review, the researcher summarized previous studies and articles related to study variables using the single paragraph system. Where studies are arranged according to the year of publication (*Descending Chronological Arrangement*). Then, comments were made on these studies, with the most important distinguishing aspects of this study from the rest of the other studies.

Moreover, we justify the choice of these studies from the very vast previous studies, is that we chose the studies in a narrower range of criteria, namely: The data size, data structure, type of indicators in case of DEA, type of DEA, place scope, and relevant literature.

These studies were also classified according to the current study variables and the relationships between them from several axes, namely: (1) axis PSM, (2) axis of ethical behaviour, (3) axis of organizational performance, (4) axis of the relationship between the studied variables. In what follows, the researcher will present a summary of these studies, then he will present aspects of agreement and difference between these studies, then explain the aspects of agreement and difference, and then the scientific gap will be illustrated more by identifying the difference of the current study from the previous studies. In the end, the benefits of previous studies will be clarified in the current study.

#### **2.4.1 Public Service motivation**

The study of [Ward & Miller-Stevens \(2020\)](#) entitled: “Public Service Motivation Among Nonprofit Board Members and the Influence of Primary Sector of Employment”.

The aim of this study was to examine PSM and its antecedent conditions and dimensions if it applies to non-profit board members to show the variations in PSM levels between board members who have worked mainly in the non-profit, public, or private sectors. The goal of this study can fall in three folds. First, researchers intend to make a better understanding of “*why individuals are motivated to serve on non-profit boards of directors*”. Second, they aim to “*expand the non-profit*

*and theoretical literature by linking theory and practice within the context of PSM and non-profit board participation*". Third, they adapt a well-developed framework for PSM, to the non-profit sector within a new environment. Researchers adopt a survey instrument to collect the data electronically using a controlled chain-referral method of the survey via the original scale of (Perry, 1996), while they measure the antecedent conditions of PSM scale using (Perry, 1997). The study was conducted in the *Georgia Center for Nonprofits Association*, where 1,046 surveys were returned from 3,000 organizations of which 679 surveys were usable. Researchers applied descriptive statistics to report the demographics variables. Confirmatory factor analyses (CFA) were employed to measure the model fit of PSM among the non-profit board members. Then, they calculate the goodness of fit between the groups (public, private, non-profit) sector employees. The study data were analyzed using (STATA 12 software package) with Structural Equation Modeling abilities. Results show that board member roles and duties by sector of employment, disclose that private sector employees were over-represented in board chair positions (60.9% of board chairs are from the private sector, while 52.1% of all board members are from the private sector). Reliability analysis using exploratory factor analysis revealed latent dimensions of PSM were highly correlated and that indicated good reliability. Also, researchers calculate a first-order confirmatory factor analysis, where the score was 0.936 in this model reveals adequate model fit. Thus, the results demonstrate that the COM dimension has been shown to present measurement problems, which result in three items being dropped from the original dimension scale. The Measures of goodness of fit ( $\chi^2$ ) reveal a strong model fit. Consequently, researchers find the Root mean standard estimate of errors (RMSEA), where the model fit approached a very good result at 0.069. Three regression analyses were performed. In each regression model, measures of the antecedents of PSM were included as independent variables, with adding two dummy variables for the primary sector of employment (non-profit and private sectors). Regression analyses indicate that all the three models were significant, explaining between 8.6% and 14.3% of the variance in each model. And In all the models, they failed to predict the dimensions of PSM for those



who are working in the non-profit sector. On the other hand, results show a negative relationship with all three dimensions of PSM among board members.

The study of [Belrhiti et al. \(2020\)](#) entitled: *“The effect of leadership on public service motivation: a multiple embedded case study in Morocco”*.

The goal of this study was to investigate and explore the basic mechanisms and contextual conditions in which leadership may impact the PSM of health service providers in Moroccan hospitals. Researchers adopted the Realist evaluation approach to identify the causal effect of leadership on PSM. To study was conducted using a qualitative multiple embedded case study design approach. In order to achieve the goals of the study, researchers have applied the steps of the Realistic cycle steps to the structure of the study: (i) eliciting the initial program theory, (ii) designing the study, (iii) carrying out the data collection, (iv) analyzing the data and (v) synthesis. The study was conducted using in-depth interviews for 17 individuals in 4 Moroccan hospitals along with 7 focus group discussions and 8 group discussions with different hospital staff (i.e., administrators, nurses, and doctors). Therefore, they have a collection of relevant documents (e.g., performance audit, human resource availability) and do an observation. The results of this study show that compassion and self-sacrifice are the most important components of PSM for the frontline in the hospitals. They also, found that the intrinsic motivation of health providers is prolonged due to their sense of competence and their ability to appropriately apply their professional skills and competencies. Additionally, this study presumes that hospital leaders must be able to balance different leadership styles according to the profile of hospital workers, the nature of the tasks assigned to them, and the organizational culture, hence, if they want to increase PSM, intrinsic motivation and organizational commitment. The researchers made recommendations for future research, such as exploring the role of congruence of values and understanding how social institutions (such as religion, family education, and professionalism) can shape PSM for health workers in low- and middle-income countries.

The study of [Deng et al. \(2019\)](#) entitled: ***“Public service motivation as a mediator of the relationship between job stress and presenteeism: a cross-sectional study from Chinese public hospitals”***.

This study intended to discover the relationships between job stress (JS), PSM, and presenteeism, along with how job stress and PSM influence presenteeism in a large national sample of Chinese healthcare workers. Researchers used a cross-sectional survey including 1392 healthcare workers from 11 Class A tertiary hospitals in eastern, central, and western China. This cross-sectional study was performed in 11 random selected representative Class A tertiary hospitals in eastern China (n = 5), central China (n = 3) and western China (n = 3) in 2016. in accordance with the ratios of the number of Class A tertiary hospitals in these three regions (5.2: 3.6: 2.6). Researchers used SPSS 20.0 and AMOS 20.0 for performing the statistical analyses, which included descriptive statistical analysis, data imputation, correlation analysis and structural equation modelling (SEM), were used to test the research hypothesis. The result reveals that PSM has a mediating role in the association between JS and presenteeism among studied hospital employees. The study also found that both dimensions of reported JS (challenge stress and hindrance stress) have degree of impacts on PSM. Where, hindrance stress was (positively associated) with presenteeism, although, (challenge stress) was not significantly directly affected (presenteeism). Researchers have recommended that in order to enhance the JP and service quality among healthcare workers, JS should be reduced and PSM increased. Further, the managers of public hospitals should create a suitable environment for workers that could limits worker stress and lowers presenteeism.

The study of [Brænder & Andersen \(2013\)](#) entitled ***“Does Deployment to War Affect Public Service Motivation? A Panel Study of Soldiers Before and After Their Service in Afghanistan”***.

The aim of this study was to investigate the impact of deployment to war on the PSM for a sample of Danish inexperienced and experienced soldiers in Denmark using panel data for two different groups from two companies. The researchers used a survey as study tool by operationalizing the PSM dimensions using the Perry (1996) items translated to Danish. The overall sample number was 244 soldiers from

two companies. Researchers had divided the survey into two waves, where, on the first survey the response rate was 70% and in the second, it was 52%, With a total of 78%. And both groups answered before and after their deployment. In total, 89 soldiers answered only before deployment, and 44 answered only after deployment, with a final total of 211 soldiers. In order to use panel data analysis, researchers do a Hausman test. The Hausman test indicate that fixed and random effects models do not give any different results for the study sample. So, researchers present random-effects models with the unbalanced panel of 211 respondents for the reason that fixed-effect analyses cannot be used. Hence, they use the time-invariant variable which is *Gender* to strengthen the robustness of the study analysis. Thereafter, all the analyses that have been used after regressions with the deployment as the independent variable, PSM dimensions as dependent variables, and earlier deployment experience as the moderator, analysing the unbalanced panel have been done, where researchers only used random-effects regressions, where what fixed-effects regressions do not allow to researcher to include respondents who did not answer in both rounds. The results found that deployment to the war zone in Afghanistan influenced by Danish soldiers' PSM differently for the different dimensions disproportionately. For instance, the dimension of COM had decreased, and CPI increased during the first deployment. The soldiers' level of self-sacrifice was not significantly changed. The study gives some suggestions for future research, such as, the need of more PSM panel studies.

#### **2.4.2 Ethical Behaviour**

The study of Lee (2020) entitled “*Impact of organizational culture and capabilities on employee commitment to ethical behavior in the healthcare sector*”.

The goal of this study was to empirically assess the impacts of the organization's culture with three sub-dimensions that is (Group culture, Hierarchical culture, Ethical culture) along with capabilities on employee commitment with two sub-dimensions namely (Education/training support, Response capability support) to ethical behaviour in the healthcare sector of South Korea by studying the Ethical

responsibility commitment. Data were gathered from a member that participating hospitals that have contact with 100 beds. The study was conducting by voluntary basis survey depending on previous studies measurements. Hence, researcher conduct a pilot study where the questionnaire distributed on ten managers and/or medical staff in the participated hospitals. Researcher had distributed 700 questionnaires with response rate of (33.71%) 236 questionnaires. After cleaning the dataset, the finale sample consists of 228 questionnaires (32.57%). The survey utilized 5-point Likert scales to assess the constructs. Researcher analysed the study data and hypotheses by SPSS 21.0 and the AMOS 21.0 programs using structural equation modelling (SEM). Reliability analysis was also tested via Cronbach's alpha with a value of (0.930) for group culture as the higher value, and (0.749) for the hierarchical culture as the lowest value. Therefore, researcher do a validity test using CFA, and principal component analysis (PCA). The constructs PCA cumulative percentages of explained variance were (70.744), where, loading values of each factor varied from (0.501) to (0.853). The results of CFA reviled a convergent and discriminant validity for the constructs. The goodness of fit model had the values of [*CFI* (0.960), *RMSEA* (0.047), *SRMR* (0.073)] that were good for fit and  $\chi^2/df$  (1.504) was significant. Hence, results reviled that the standardized path coefficient between education/training support and ethical responsibility commitment was statistically insignificant (0.036). While response capability support and ethical responsibility commitment was statistically significant at the alpha level (0.001), with a value of (0.521). These results propose practical methods that can motivate hospital's staff to increase ethical performance via organizational capability. Therefore, hospitals that are planning to build ethical culture it must emphasis on how to make ethical values socially accepted.

The study of [Abbas & Kowang \(2020\)](#) entitled “*Impact of Ethical Leadership and Islamic Work Ethics on Employee Commitment and Job Satisfaction*”.

This study intended to discover the impact of work ethics particularly the Islamic work ethics and ethical leadership on job satisfaction and employee commitment. This study was applied in the

banking sector in Pakistan. Where the study sample consisted of 200 employees from selected Pakistani banks [i.e., United Bank Limited, Bank Alfalah, Mezan Bank, Allied Bank and Habib Bank limited], who were selected using convenient sampling technique. Researchers used questionnaire as the main tool for collecting the data. 200 questionnaires were distributed, and 148 questionnaires were retrieved, with a response rate of 74%. Study data analysed via SPSS to find descriptive, correlation, and regressions analysis. Research results reveals that there is a strong and positive impact of ethical leadership and work ethics on job satisfaction and employees' commitment ( $R^2 = 0.654$ ). Moreover, the impact of Islamic work ethics on employee commitment is found positive with a value ( $R^2 = 0.325$ ). Hence, the impact of ethical leadership on job satisfaction is found to be positive with a value of ( $R^2 = 0.602$ ).

The study of [Fan et al., \(2019\)](#) entitled “***Role of community health service programs in navigating the medical ethical slippery slope—a 10-year retrospective study among medical students from southern China***”.

The primary purpose of this study was to investigate the role of community service programs (CHS) as an autonomous learning motivation process that can influence community-oriented service and ethics for medical students and graduates working at Shantou University Medical College. to fulfil the aim of this study, researchers adopted a 10-year retrospective model using a cross-sectional survey study design for 3rd- and 4th-year medical students and graduates working at Shantou University Medical College. Study sample consisted of 663 student and graduates participated, were 361 (54.4%) undergraduate medical students and 302 (45.6%) graduates participated. To obtain the data researchers used revised anonymous self-administered questionnaire. More, researchers applied thematic approach via interviews in order to analysis the responses of the participated sample. The reviewed questionnaires involved an evaluation questionnaire on cultivating medical ethics in (CHS) context. Significant differences were observed in self-evaluation of the cognitive development of ethics between those who had participated in

CHS programs 1–5 times and those who had participated >6 times. The successful identification of accepting money from the patients under the table as unethical behaviour significantly differed ( $p = 0.031$ ) among the graduates but not ( $p = 0.567$ ) among the undergraduate students. The participants expressed the positive impact of CHS programs on their self-development. In medical education in China, CHS programs can be widely applied. This training strategy, which promotes medical integrity and integrates humanitarian conduct as a complement to learning, should be supported, and promoted globally.

The study of [Joseph, Berry, & Deshpande \(2010\)](#) entitled “*Factors That Impact The Ethical Behavior Of College Students*”.

The goal of this study was to assess the factors that impact the ethical behaviour of college students in midwestern and north-western United States. In this study, researchers adopted the survey method on a sample of students from several universities in the midwestern and north-western United States. The sample size was 210 college students, where 182 survey was deemed valid, with a high response rate of 86%. The survey contained several items including measures of ethical behaviour by measuring sub-variables such as (ethical behaviour of self, and ethical behaviour of peers/co-workers), hence, they measure overclaiming and demographic measures. Results reveal that the ethical behaviour of peers/co-workers had the most significant impact on students’ ethical behaviour. Moreover, the success of students as defined by researchers (in terms of grade point average), and the gender of the respondents, were also found to be significantly impacted ethical behaviour. On the other hand, female students were significantly more ethical than their male peers. Consequently, the results find that the race of the respondent did not have any influence on their ethical behaviour. Overclaiming scales results show that social desirability bias had a significant impact on the study results. Researchers also indicated that peers with high ethical values can set the tone or adjust the behaviour of other students, and ethical training could be more practical rather than just a theory.

### 2.4.3 Organizational Performance via DEA and two stage DEA

The study of Seddighi, Nejad & Basakha, (2020). entitled “*Health systems efficiency in Eastern Mediterranean Region: a data envelopment analysis*”.

This study was designed to present a reality of the Eastern Mediterranean (EM) health systems efficiency, and determine which countries had the most efficient health system and vice versa. To achieve these goals, the study relied on DEA models to estimate the efficiency scores. Data are obtained from World Health Organization data from the Global Health Observatory for the year 2018. The study sample consist all the EM countries which considered as the DMUs for this study, with excluding the following countries in term of homogeneity (Afghanistan, Djibouti, Somalia, Sudan, Syria, and Yemen). Researchers justify this exclusion from the low-income point of view, where the above-mentioned excluded six countries had a low income comparing to the other countries. Researchers take three inputs specifically (Physicians, Hospital beds, Health) and two outputs namely (Expenditures Life expectancy and Infant survival rate), where the data was taken from the World Health Organization’s Health Surveillance Sect. 2017. Researchers analysed the data via DEA online solver - online application -, it is a software available at the University of Hagen, Germany. The study came out with a number of results, the most important of them: (i) Qatar had the highest level of life expectancy from all the countries (78.2) and Pakistan had the lowest with (66.4); (ii) Bahrain had the highest infant survival rate with 92 score and the lowest was Pakistan with 16.86 scores, knowing that the total average for all the sample was around 92; (iii) Lebanon had the rank (31) as the maximum rank from all the sample in the number of physicians and Morocco was the minimum rank (6.3); (iv) Bahrain, Egypt, Iran, Lebanon, Morocco, Oman, Pakistan, Qatar, Tunisia and the United Arab Emirates, had the most efficient health system, but on the other hand, countries such as Iraq, Jordan, Kuwait, Libya, Palestine and Saudi Arabia, had inefficient health system; (vi) Jordan and Palestine ranked the second in term of efficiency, followed by Kuwait, Saudi Arabia and Libya and lastly was Iraq in the fourth rank.



The study of [Sultan & Crispim \(2018\)](#) entitled “*Measuring the efficiency of Palestinian public hospitals during 2010–2015: an application of a two-stage DEA method*”.

The aim of this paper is to assess the productive efficiency of West Bank public hospitals and to research contextual factors that lead to differences in productivity. Researchers used data were obtained from the official annual health reports to investigated technical efficiency among 11 public hospitals in West Bank-Palestinian public hospitals from the year 2010 - 2015 with excluding two hospitals from the sample for the homogeneity and biased assumptions with a total of 66 observations and (1377) beds. Researchers extracted four input measures namely (Hospital beds, Doctors (Full-Time Employees) FTEs, Health FTEs, Administrative FTEs) and three output measures namely (Inpatient days, Outpatient visits, Emergency care) from the annual reports. Researchers used two milestones DEA models, i.e., the CCR and the BCC. Researchers used input-oriented DEA models to assess and measure efficiency scores as a first stage DEA. Further elaboration on performance, researchers used Tobit regression to identify contextual factors whose influence on inefficient performance is statistically significant as a second stage DEA concerning environmental factors. Results shows that different sources of inefficient performance exist; where inefficient hospitals (P02 and P10) operations are attributed to scale effects, while inefficient P06 and P07 hospitals operations are attributed to pure technical effects. Researchers yielded the inefficiency of P02 and P10 to a problem in the ministry, while P06 and P07 are a hospital management problem. P07 and P02 hospitals were ranked in 10 and 11 places, respectively, and further efforts should concentrate on improving their results. Consequently, the study reveals the reality about the hospitals that working over the occupancy rate (> 100%). More specifically hospital P11 the largest hospital between all the hospitals in West Bank showed efficient performance.

The study of [Stefko, Gavurova & Kocisova \(2018\)](#) entitled “*Healthcare efficiency assessment using DEA analysis in the Slovak Republic*”.



The main objective for this study was to evaluate and assessing the regional efficiency of healthcare facilities for the period between 2008 and 2015 in eight different regions Slovakia. Where the other object was to quantify the influence of nonstandard DEA variables on the results of evaluating the efficiency and suitability of healthcare facilities in assessing controlled processes, such as the use of medical techniques. The study used DEA technique and specifically Window approach (Window-DEA). Researchers used two stable inputs viz. (beds number, medical staff numbers), two stable outputs namely (beds usage, nursing time average), and three inputs (total number of medical equipment, magnetic resonance (MR) devices numbers, number of computed tomography (CT) devices). Researchers used secondary data from the *National Health Information Center* and the Slovak Statistical Office to obtain the data. Among the most important findings of the study is that in all the 8 studied areas, analysis shows there is an indirect dependence between the values of the variables over time and the expected efficiency results. Additionally, results indicate high degree of efficiency reached by regions that had minimal values of the variables over time. This study estimated 8 models using DEA where the m1 (model 1) indicate that four regions achieved average efficiencies above the average of the whole sample and the rest of the regions are below the average efficiency scores. Alternatively, some other regions like Trnava, Trencin, and Nitra had efficiency scores equal to one, between all the years 2008-2015, Trnava (2008 to 2015); Trencin (2011, 2012, and 2015); Nitra (2009). Contrarily, researchers found out that the gradual replacement of the variables “total number of MR devices”, “total number of CT devices” and “number of all medical devices” to input side did not significantly influence the overall estimated efficiency of healthcare services in studied regions.

The study of [Campanella et al., \(2017\)](#) entitled “*Hospital efficiency: how to spend less maintaining quality?*”.

In this study, researchers aimed to propose a methodological framework to evaluate the Italian public health sector’s technical efficiency via DEA. More, this research had another purpose where researchers aimed to evaluate if/how efficiency is affected by several

exogenous factors. Researchers tried to identify relative efficiency by comparing 50 public hospitals, with a set of inputs (“Number of beds per patient admitted, Number of medical doctors per patient admitted, Number of nurses per patient admitted”) and outputs (“Risk-adjusted mortality for acute myocardial infarction, Risk-adjusted mortality for congestive heart failure, Risk-adjusted mortality for pneumonia”). The data of this study have been gathered from Italian national databases. Results revealed that Italian public hospitals had an efficiency score of (77%) and an SD of (0.12). The outputs slacks results show that the following (Y1, Y2, Y3) outputs should be increased to be efficient even if each hospital in the study sample reached its input target value. In the second stage of DEA, researchers used the Tobit regression model and used the first DEA results as dependent variable. Tobit regression test yielded that there is a positive relationship the lower case-mix index in the hospitals in the north of Italy. The conclusion of the researchers regarding the usage of DEA to measure technical efficiency of hospitals, that they supported the fact that DEA could help decision makers and policy makers’ decisions.

The study of [Sultan & Crispim \(2016\)](#) entitled “*Evaluating the Productive Efficiency of Jordanian Public Hospitals*”.

The goal of this study was to explore the Jordanian Public Hospitals' technical and scale efficiency. Researchers used constant and variable returns in this study to scale input-oriented DEA models to rank hospitals and assign the variables associated with inefficient units. The researchers tested 27 public hospitals between the years 2010 to 2014, with a total of 135 observations were studied for four input measurements namely (Number of beds, Physicians, Health Cadre, Administrative Cadre) and three output measurements namely (Inpatient, Outpatient, and Ambulance and Emergency departments). Researchers used Constant Return to Scale (CRS) model and Variable Return to Scale (VRS) model to decompose efficiency into the scale and technical efficiencies. A sample of 27 hospitals operating 4226 beds was examined, 90 percent of the total 4693 public hospital beds, and the rest of the sample were excluded with a total number of 467 bed (10%). Researchers used an analytic methodology of five stages to

conceptualize a productivity improvement plan, (1) scoring efficiency, (2) a complete ranking of hospitals, (3) benchmarking sets, (3) deviations from target measures and (5) scale inefficiencies. The results show constancy all through the five stages. To clarify, results indicate that handling the slacks in out-patient visits of AL-Basheer hospital and Prince Hamza hospital offer additional hundreds of thousands of out-patient visits, also the slacks in emergency services of Princess Basma, AL-Nadeem and AL-Mafraq hospitals in addition to thousands of trauma cases, such benefits could be passed on to Syrian refugees within the available capacity. The best annual average performance was achieved in 2013 and was shared by 3 efficient hospitals. Nevertheless, the year 2014 was shared by 8 productive and efficient hospitals to construct the efficient frontier. The eight hospitals are all poorly efficient. That is, all the 27 public hospitals have the potential to boost their efficiency, and that may enhance their operations effectiveness, as will giving their managers will benefit from our performance.

#### **2.4.4 The relation between variables**

##### **2.4.4.1 PSM and ethical behaviour**

The study of [Ripoll & Schott \(2020\)](#) entitled “*Does public service motivation foster justification of unethical behavior? Evidence from survey research among citizens*”.

This study intended to answer this question: “*Do highly public service-motivated individuals vary their justification of an unethical behavior when the values advanced by this behavior help to safeguard their preferred public values?*”. Where in this study researchers aimed to study the dark side of PSM by the recent suggestions by public administration research, by studying the relationship between PSM and justification of unethical behaviour with the moderation effect of individuals’ identification and the public values. In this study, researchers develop, built, and assembled previous theoretical studies on the correlation between PSM and im-morality. Researchers used a survey design in order to collect the data, via a representative sample from the citizens of Catalonia (Spain). Where, the data was gathered between (25th of March and 10th of April 2019). Researchers used a

third-party company to carry the survey which is (NetQuest), with a sample size consist of 1,512 individuals. Survey was divided into three parts, first: sociodemographic characteristics, second: the level of PSM and individuals' interpretation of the public interest, third: questions and vignettes used to measure dependent variable. In order to measure the theoretical section researchers, calculate the PSM level for the individuals who justify their unethical behaviour for their personal interests. Where the analysis divided into three steps. The first step researchers "*identified the individual's interpretation of the public interest*". Second step: included an unrelated experiment to avoid self-selection bias. Third: measuring the dependent variable, which is the unethical behavior using 7-Likert Scale, by measuring an individual's willingness to accept misconduct. A confirmatory factor analysis used to measure the entire scale of PSM, where the results of the model fit "Satorra-Bentler scaled  $\chi^2$  [df 1/2] 1/4 3.888,  $p$  1/4 0.143, RMSEA 0.025, CFI 0.999, TLI 0.996, and SRMR 0.007". Results report that there are no statistically significant impacts for gender or people with secondary studies. University studies individuals, in contrast, are shown they less likely to reveal unethical judgment. Individuals with a higher level of identification with efficiency are more likely to justify unethical behavior, on the other hand, individuals who have higher levels of PSM are less likely to justify the unethical behavior.

The study of Meyer-Sahling, Mikkelsen & Schuster (2019) entitled "*The Causal Effect of Public Service Motivation on Ethical Behavior in the Public Sector: Evidence from a Large-Scale Survey Experiment*".

The primary purpose of this study was to determine the causal effect of PSM on EB in the public sector employees using experimental large-scale survey research. In order to achieve the goal of the study, researchers hinged on a novel survey experimental questions order design. The aforementioned design based on a simple insight (i.e., asking about PSM can render salient PSM-oriented identities of respondents). The lack of experimental evidence and the limitations of the understanding of both the causes of unethical conduct and the consequences of PSM was the motivation for the researchers to conduct

this experimental study. Study survey was conducted online, in the Chilean central government, with a sample size of 15,706 employees, but only 5,742 employees completed the survey, yielding a response rate of 37%, more, from these 5,742 respondents, 974 employees choose not to reply to the researchers at least one of their 16 PSM questions. So, these respondents were excluded from the posterior analysis. As A Result, after excluding these respondents the total responses were 4,763 survey responses with a response rate of 30%. The result of this study shows that PSM and willingness to report ethical problems are significantly correlated ( $r = 0.12$ ) at the ( $\alpha=0.001$ ) alpha level. Furthermore, to assess whether this association is causal, researchers calculate the ordinary least squares (OLS) regression model. The result of the OLS model indicate that employees whose PSM is activated prior to answering how willing they would be to report ethical problems to management have a significantly higher willingness to report (est. = 0.200,  $P$  two-sided < 0.001). And to test the second hypothesis: H2: “*Activating PSM will have a larger effect on ethical reporting for respondents with higher levels of PSM*”, researchers estimated a non-linear treatment effects at differing levels of PSM. The result yielded that only the treatment has a positive significant effect at high levels of PSM, yet they did not find any significant effect at low levels of PSM. The researchers attributed this result to the suggestion that their treatment only affects employees who have some level of PSM for their treatment to activate. To end, researchers found that PSM stimulation improves willingness to report ethical problems to management. This study is the first experimental evidence that PSM may enhance ethical behavioural intent and suggests that *cultivation* PSM for public servants can benefit public sector ethics.

The study of [Ripoll & Ballart \(2019\)](#) entitled “***Judging Unethical Behavior: The Different Effects of External and Public Service Motivation***”.

This study is specifically concerned with the effect of PSM on ethical judgment, by addresses three shortcomings in the literature, viz. (i) studying the effect of PSM on external motivation, (ii) the effects of PSM on the judgment of unethical actions, and (iii) the process of

assumption of institutional logics by individuals with more basic needs satisfaction. The study sample included 574 case managers working on a program that integrates health and social services in *Catalonia (Spain)* - “*Catalan Plan for the Integration of Health and Social Services*”. The researchers contacted with 1100 professionals from social and health services involved in the implementation of the pilot plan. Hence, a 73-item standardized questionnaire was distributed. The returned questionnaire was almost 800 responses with a 72.73% response rate. The total number of questionnaires that used in the analysis was 574 (52.18% response rate) after incomplete responses were discarded. Researchers analyses the study hypotheses via *Mplus* v.6., were full structural equation modeling applied using a robust maximum-likelihood estimation. Where, the model has an acceptable fit (Satorra-Bentler scaled  $\chi^2$  [df ¼ 479] ¼ 1019.433  $p$  0.001, RMSEA 0.044, CFI 0.900, TLI 0.885, and SRMR 0.059) and explains 21.5% of the variation in the acceptance of unethical acts, 12.8% in PSM, and 6.6% in external motivation. The regression paths are found matched with the correlations table, which confirms that individuals with a higher level of PSM will be less likely to judge or accept unethical behaviour. The opposite is true for individuals who possess higher levels of external motivation. Also, the standardized coefficients indicate that the direct effect of PSM on the acceptance of unethical behaviour is larger than the effect of external motivation. The study also found that individuals who feel and perceive that they have more autonomy, competence, and relatedness tend to get higher levels of PSM. For this reason, researchers have tested the indirect effect on the sample judgment of ethics violations, and the results show it is negative and statistically significant ( $b$  ¼ 0.120,  $p$  0.001). Where also, the effect of basic needs on external motivation was negative but not statistically significant ( $p$  ¼ 0.132). Also, the indirect effect on acceptance of unethical acts was negative but not statistically significant ( $b$  ¼ 0.022,  $p$  ¼ 0.397). In another word, this indicates that this indirect effect only occurs through PSM.

The study of [Christensen & Wright \(2018\)](#), entitled “*Public service motivation and ethical behavior: Evidence from three experiments*”.

This study initially attempted to empirically articulate the linking between PSM and ethical behaviour with evidence from three experimental studies. The first study tests PSM's relationship with ethical behaviour intentions such as stated behaviour, while the second and third studies test its relationship with ethical behaviour, for example, revealed behaviour. The first study's data were gathered from undergraduate students attending a large, private, and religiously associated university. The total number of the sample of the first study was 226 participants that took part in the study, 62% were male and the average age was 21 years old. Subsequently, the students were randomly assigned to either a PSM prime or a control condition. Then, the participant's students were asked to identify the various ways in which behaving with helpfulness and kindness, play an important role in their own lives. While In the second study undergraduate students also were enrolled in the same way of the first study. The participants were randomly assigned to PSM and control treatment groups and completed the same exercises described in the first study. In this study, the number of participants was 225 60% were male and the average age was 22 years old. The results show that There were no statistically significant differences between the treatment and control group in gender or age. Results also found that very few participants (students) cheated (four in the PSM treatment condition and only 1 in the control condition). Hence, researchers perform a two-sample t-test, where the results indicated that individuals in the PSM prime group were no less likely to cheat by reporting inflated scores ( $t(253) = 1.373, p > 0.05$ ), and as with the first and second study researchers found there is no evidence that the PSM prime activated or increases participant PSM or ethical behavior. In the third study the respondents were also undergraduate students were recruited in the same way in the first and second studies but in the contrary this study was conducted online instead of in a university lab. Students were also assigned randomly to PSM and control treatment groups like the first and second studies. The total number of participants was 446 where 58% were male and the average age was 22 years old. The result shows that there is no statistically significant difference between the treatment and control group in gender or age. To summarize, through three experiments



researchers fail to confirm the relationship between PSM and ethics. Moreover, they measured ethics both attitudinally and observationally, and they conclude that even if the null findings are due to sampling characteristics or weaknesses in the priming intervention, the three studies reported here raise concerns regarding the ease with which one can influence behavior by “priming” PSM.

#### 2.4.4.2 PSM and performance

The study of [Bayram & Zoubi \(2020\)](#) entitled “*The effect of servant leadership on employees’ self-reported performance: Does public service motivation play a mediating explanatory role?*”.

In this study researchers aimed to explore the effect of employees’ leadership on their self-reported performance, and how PSM could play a mediating role in this relationship. this study has been applied to a random sample of workers in the Jordanian Customs Department. The total study population was 3000 workers. The study sample was calculated using (the Steven Thompson equation) to identify the accurate sample number. Where the suggested sample number was 380 and above, but researchers distributed 500 questionnaires and they retrieved 270 questionnaires with a response rate of (54%). Researchers used ready-made scales to measure the study variables, for instance, they used the short version of the ([Perry, 1996](#)) scale to measure PSM, [Liden et al. \(2015\)](#) to measure the Servants Leadership, and finally ([Vandenabeele, 2009](#)) scale to measure self-reported performance. Results indicate that Cronbach’s  $\alpha$  values were between (0.72 to 0.89), hence, Average Variance Extracted (AVE) was also calculated to test the convergent validity. The values of (AVE) were between (0.5 to 0.7), but the civic duty dimension of PSM was under the acceptable upper limit with a value of (0.470). Besides, as a final step after measuring the validity of the tool, they test the internal association between variables using a correlation matrix to measure the internal reliability, where all the factors were found to be above the acceptable value of (0.70). Results of path analysis using Structural Equation Modelling (SEM) revealed that PSM has a significant positive relationship with the self-reported performance of employees, where the model fit results were as following: “( $\chi^2/df$ ) = 1.62, CFI = 0.92, IFI = 0.92, TLI = 0.91, RMSEA



= 0.048, SRMR = 0.065, PClose = 0.694”. Moreover, all the proposed hypotheses have been accepted positively, but the only one that has been accepted negatively is the relationship between servant leadership and employee performance ( $\beta = -0.148, p < 0.008$ ). However, to test the mediating hypothesis (indirect effect of PSM on employee performance), researchers used bias-corrected bootstrapping and Bias-corrected confidence level of 0.90. Results indicate that PSM has positive correlation with employee performance “( $\beta = 0.259, p < 0.001, CI 0.176:0.357$ )”.

The study of [Stefurak, Morgan & Johnson \(2020\)](#) entitled “*The Relationship of Public Service Motivation to Job Satisfaction and Job Performance of Emergency Medical Services Professionals*”.

This study primarily tries to delve into the relationship between PSM, job satisfaction, and performance for employees working in medical professions. Moreover, this study aimed to test if PSM using a four-scale-factor model structure (Policy Making, Public Interest, Self-Sacrifice, and Compassion) appears in this study sample. Study data have been collected using online forums via the website of *SurveyMonkey*. Researchers had sent 10,675 Emergency Medical Services Professionals (EMS), where 1,403 respondents had completed the forums with a response rate of (18.61%). To measure PSM researchers used the revised 24-item Perry (1996) scale, Vandenberg (2009) and Naff and Crum (1999) scales to measure performance, and finally Vandenberg (2009) to measure satisfaction. Exploratory Factor Analysis (EFA) via principal component analysis has been applied to measure the construct validity, and it results in a single factor with (52.59%) explaining variance. More, the results of EFA yielded four factors explained (43.14%) of the variance. Researchers used CFA to assess the validity of the structure, the CFA results for the initial PSM factor structure were not a sufficient fit with the data sample of the study. Thus, most of the variance in job satisfaction has been explained by the two sub-dimensions of PSM (Self-Sacrifice and Public Interest). However, COM was related to public service and policy, positively and moderately. Furthermore, all three factors were significantly related to job satisfaction, but not related to job performance.

The study of [Alreshoodi \(2019\)](#) entitled “***Public Service Motivation and Performance Behavior in Saudi Public Sector: The Role of Subjective Fits***”.

The goal of this study was to explore the relationship between PSM and performance mediating with the role of subjective fits in Saudi Health Affairs. The researcher used a survey design to shape the setting of this study. The data of this study were gathered via a web-based survey of the employees who are working in seven public hospitals working under the supervision of *The General Directorate of Health Affairs in Hail Region*. The researcher used ([Kim, 2009](#)) a 12-items international scale to measure PSM, [Cable and Judge \(1996\)](#), [Cable and DeRue \(2002\)](#) scales to measure subjective fits, and [Williams and Anderson’s \(1991\)](#) scale to measure in-role and extra-role performance behavior. The study sample was the whole population with a number of (925) employees, where only (358) employees finish the filling the questionnaires with a response rate of (38.8%). Data were analyzed via SEM in order to test the direct and indirect relationships between the studied variables. Results show that PSM has a direct and positive relationship with in/extra-role behaviors. Researcher used CFA to test the validity and reliability of the data, where all the results were satisfying and meet all the criteria of validity and reliability of model fitting “( $\chi^2 = 74.6$  ( $df = 21$ ;  $p < 0.001$ );  $CFI = 0.949$ ;  $TLI = 0.913$ ;  $SRMR = 0.032$ ;  $RMSEA = 0.085$ )”. Hypothesis testing using SEM has been applied with and without control variables demonstrates good fit “( $\chi^2 = 191.43$  ( $df = 4$ ;  $p < 0.001$ );  $CFI = 0.937$ ;  $TLI = 0.926$ ;  $SRMR = 0.051$ ;  $RMSEA = 0.062$ )”, and these results indicate a positive direct relationship between PSM and performance.

The study of [Miao et al. \(2019\)](#) entitled “***Public service motivation and performance: The role of organizational identification***”.

This study aimed to examine the role of organizational identification (OI) on the relationship between PSM and job performance, by demonstrating in what way OI can play a role as a key mechanism that explains how PSM could leads to higher levels of performance. Therefore, this study intended to analyse the role of OI as a mediator of the relationship between PSM and job performance. The

study data were obtained from Chinese civil employees working in government bureaus in Shanghai, Zhejiang, and Jiangsu, where the total of the sample were 135 bureau directors. Researchers utilized this study by using pre-validated multi-item scales. Researchers performed a confirmatory factor analysis (CFA) using *Mplus* to determine the discriminant validity between study variables. The result of CFA model yielded an excellent fit to the data (CFI<sup>1</sup>= 0.991; TLI<sup>\*\*</sup>= 0.989; WRMR<sup>\*\*\*</sup>= 0.744). Moreover, the hypothesis tested using regression analysis by *Mplus* using the maximum likelihood estimator. Where the results shwas that OI was found to explain the relationship between PSM and job performance in the Chinese civil employees. Also, the study exposes that OI is a key mechanism that explains why employees with high levels of PSM perform at higher levels in their role, the more an individual identifies with the public sector organization they work for, the more they integrate the organization's beliefs and values into their self-concept. Researchers put some recommendations for future research, such as, future studies may possibly assess the impact of personal dispositions for example power and face on OI and job performance. Further, future researchers could also explore the boundary conditions of our mediated PSM-job performance relationship by exploring whether the situational context in which individuals with high levels of OI operate affects the relationship.

To sum up everything that has been stated so far, researcher summarizes all the prior studies in the following table (Table 2-10) according to its year of publication, method, studied variables, approach, statistical techniques and results.

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<sup>1</sup> CFI = comparative fit index; \*\*TLI = Tucker-Lewis index; \*\*\*WRMR = weighted root mean square residual.

Table 2-10: Prior studies summery

Author/s	Method	Variables	Approach	Statistical Technique/s	Results
<b>Public Service Motivation</b>					
Ward & Miller-Stevens (2020)	Electronically Survey using Chain-referral Method of Survey Administration	PSM antecedent conditions and its dimensions	Quantitative	Descriptive statistics/ Confirmatory factor analyses/ Structural equation Modeling (SEM)/ analysis of variance (ANOVA)/ Exploratory Factor Analysis (EFA)/ Confirmatory factor Analysis (CFA)/ Root mean standard estimate of errors (RMSEA)	<p>1- Results shows that board member roles and duties by sector of employment, disclose that private sector employees were over-represented in board chair positions (60.9% of board chairs are from the private sector, while 52.1% of all board members are from the private sector).</p> <p>2- First-order confirmatory factor analysis model, reveals adequate model fit with a score of 0.936.</p> <p>3- Results demonstrate that COM dimension has been shown to present measurement problems, which result in three items being dropped from the original dimension scale.</p> <p>4- The Measures of goodness of fit (<math>\chi^2</math>) reveal strong model fit.</p> <p>5- Root mean standard estimate of errors (RMSEA) model fit, approached a very good result at 0.069.</p> <p>6- Regression analyses indicate that all the three models were significant, explaining between 8.6% and 14.3% of the variance in each model.</p> <p>7- Results failed to predict the dimensions of PSM for those who being working in the non-profit sector.</p> <p>8- Results show negative relationship with all three dimensions of PSM among board members.</p>

Author/s	Method	Variables	Approach	Statistical Technique/s	Results
Belrhiti <i>et al.</i> (2020)	Qualitative multiple embedded case study design approach by adopted a Realist Evaluation Approach	PSM (intrinsic motivation) and leadership	Qualitative	Realistic evaluation cycle using focus groups/ ICAMO* Configurational Analysis * Intervention-Context-ActorMechanism-Outcome	<p>1- The results of this study show that compassion and self-sacrifice are the most important components of PSM for frontline in the hospitals.</p> <p>2- Intrinsic motivation of health providers are prolonged due to their sense of competence and their ability to appropriately apply their professional skills and competencies.</p> <p>3- The staff found that the transactional leadership style of CEOs was incongruent with their professional values and their need for autonomy.</p> <p>4- The results show that the intrinsic motivation of health providers is sustained by their feelings of competence and their ability to adequately apply their professional skills and competencies.</p>
Deng <i>et al.</i> (2019)	Cross-Sectional Survey	PSM, Job stress, and Presenteeism	Quantitative	Descriptive statistical analysis, Data imputation Structural equation modelling (SEM) using SPSS 20.0 and AMOS 20.0	<p>1- The result reveals that PSM has a mediating role in the association between job stress and presenteeism among studied hospital employees.</p> <p>2- The study also found that both dimensions of reported job stress challenge stress and hindrance stress have degree of effects on PSM.</p> <p>3- Hindrance stress was positively associated with presenteeism.</p> <p>4- Challenge stress was found not significantly directly affected presenteeism</p>
Brænder & Andersen (2013)	Survey Design	PSM with perry (1996) dimensions and Deployment to War/	Quantitative	Panel data analysis/ random-effects models/ Random-effects regressions	<p>1- The results found that deployment to the war zone in Afghanistan influenced by Danish soldiers' PSM differently for the different dimensions disproportionately.</p> <p>2- The dimension of PSM (COM) had decreased, and (CPI) increased during the first deployment.</p>



Author/s	Method	Variables	Approach	Statistical Technique/s	Results
		Gender as a time-invariant variable			3- The soldiers' level of self-sacrifice was not significantly changed.

#### Ethical Behaviour

Author/s	Method	Variables	Approach	Statistical Technique/s	Results
Lee (2020)	Survey Design	Organisational culture/ Organisational capability/ Ethical responsibility commitment	Quantitative	Frequency distribution analysis/ Structural equation modelling (SEM)/ Reliability analysis/ Validity test using CFA/ principal component analysis (PCA)	1- Reliability analysis was also tested via Cronbach's alpha with a value of (0.930) for group culture as the higher value, and (0.749) for the hierarchical culture as the lowest value. 2- The constructs PCA cumulative percentages of explained variance were (70.744). 3- where, loading values of each factor varied from (0.501) to (0.853) 4- The goodness of fit model had the values of [ <i>CFI</i> (0.960), <i>RMSEA</i> (0.047), <i>SRMR</i> (0.073)] that were good for fit and $\chi^2/df$ (1.504) was significant. 5- Results revealed that the standardized path coefficient between education/training support and ethical responsibility commitment was statistically insignificant (0.036). 6- Results revealed that response capability support and ethical responsibility commitment was statistically significant at the alpha level (0.001), with a value of (0.521).

Author/s	Method	Variables	Approach	Statistical Technique/s	Results
Abbas & Kowang (2020)	Survey Design	Ethical Leadership and Islamic/ Work Ethics / Employee Commitment / Job Satisfaction	Quantitative	Descriptive analysis / Correlation analysis / Regressions analysis	<p>1- There is a strong and positive impact of ethical leadership and work ethics on job satisfaction and employees' commitment (R2= 0.654).</p> <p>2- The impact of Islamic work ethics on employee commitment is found positive with a value (R2=0.325).</p> <p>3- The impact of ethical leadership on job satisfaction is found to be positive with a value of (R2= 0.602).</p>
Fan <i>et al.</i> , (2019)	Survey Design/ Thematic Approach	Self-evaluation of ethical sensitivity development/ Self-reports of ethical behaviour.	Mixed Method	Descriptive analysis / Frequency description analysis/ T-test/Qualitative content analysis	<p>1- The results show a difference between the two samples for the successful identification of unethical behaviour such as “<i>accepting money from patients under the table</i>” as varied significantly (<math>p = 0.031</math>) among graduates but not (<math>p = 0.567</math>) among undergraduate students.</p> <p>2- Study finds observed significant differences in the self-evaluation of the cognitive development of ethics between those students who had contributed in CHS programs 1 to 5 times and those who had participated more than 6 times.</p> <p>3- Results showed that the participants students in these programs stated a positive impact of the CHS programs on their self-development.</p> <p>4- The opinions of the participants were mostly are very positive, as demonstrated by content analysis: “(1) <i>Learned to transpose thinking and better understand and sympathize with the patients.</i> (2) <i>Enhanced our sense of responsibility and motivated us to study hard.</i>”</p>

Joseph, Berry, & Deshpande (2010)	Survey Design	Ethical behavior of self/ Ethical behavior of peers/co-workers/ Success/ Gender	Quantitative	Descriptive analysis / Correlation analysis / Regressions analysis	<p>1- Ethical behaviour of peers/co-workers had the most significant impact on student's ethical behaviour.</p> <p>2- Success of students as defined by researchers (in terms of grade point average), significantly impacted ethical behaviour.</p> <p>3- Gender of the respondents found to be significantly impacted ethical behaviour.</p> <p>4- Female students were significantly more ethical than their male peers.</p> <p>5- Results find that the race of the respondent did not have any influence on their ethical behaviour.</p> <p>6- Overclaiming scales results shows that social desirability bias had a significant impact on the study results.</p>
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**Organizational Performance via DEA**

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Seddighi, Nejad & Basakha, (2020)	Input oriented CCR DEA	Physicians, Hospital beds, Health Expenditures	Life expectancy and Infant survival rate	CCR model, Efficiency ranking	<p>1- Qatar had the highest level of life expectancy from all the countries (78.2) and Pakistan had the lowest with (66.4)</p> <p>2- Bahrain had the highest infant survival rate with 92 score and the lowest was Pakistan with 16.86 score.</p> <p>3- Lebanon had the rank (31) as the maximum rank from all the sample in the number of physicians and Morocco was the minimum rank (6.3).</p> <p>4- Bahrain, Egypt, Iran, Lebanon, Morocco, Oman, Pakistan, Qatar, Tunisia and the United Arab Emirates, had the most efficient health system, but on the other hand, countries such as Iraq, Jordan, Kuwait, Libya, Palestine and Saudi Arabia, had inefficient health system.</p> <p>5- Jordan and Palestine ranked the second in term of efficiency, followed by Kuwait, Saudi Arabia and Libya and lastly was Iraq in the fourth rank.</p>
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Stefko,  
Gavurova  
&  
Kocisova  
(2018)

Input oriented  
CCR DEA  
and the varia-  
ble return to  
scale (BCC  
model)

**Stable in-  
puts:** beds  
number, med-  
ical staff num-  
bers/**Inputs:**  
total number  
of medical  
equipment,  
magnetic res-  
onance (MR)  
devices num-  
bers, number  
of computed  
tomography  
(CT) devices

**Stable out-  
puts:** beds  
number,  
medical  
staff num-  
bers

Tow stage DEA model:

- 1- CC  
R and BCC  
models
- 2- Wi  
ndow ap-  
proach (Win-  
dow-DEA)

1- Among the most important findings of the study is that in all the 8 studied areas, analysis shows there is an indirect dependence between the values of the variables over time and the expected efficiency results.

2- Results indicate high degree of efficiency reached by regions that had minimal values of the variables over time.

3- This study estimated 8 models using DEA where the m1 (model 1) indicate that four regions achieved average efficiencies above the average of the whole sample and the rest of the regions are below the average efficiency scores.

4- Some other regions like Trnava, Trencin, and Nitra had efficiency score equal to one, between all the years 2008-2015, Trnava (2008 to 2015); Trencin (2011, 2012, and 2015); Nitra (2009).

5- The gradual replacement of the variables “total number of MR devices”, “total number of CT devices” and “number of all medical devices” to input side did not significantly influence the overall estimated efficiency of healthcare services in studied regions.

Sultan & Crispim (2018)	Input oriented CCR DEA	Hospital beds numbers, Doctors FTEs, Health FTEs, Administrative FTEs	Inpatient days, Out-patient visits, Emergency care	Two stage DEA model: 1- CC R and BCC models 2- Tobit regression	<p>1- There is different sources of inefficient performance exist, where inefficient hospitals (P02 and P10) operations are attributed to scale effects.</p> <p>2- Inefficient P06 and P07 hospitals operations are attributed to pure technical effects.</p> <p>3- P07 and P02 hospitals were ranked in 10 and 11 places, respectively, and further efforts should concentrate on improving their results.</p> <p>4- Study reveals the reality about the hospitals that working over the occupancy rate (&gt; 100%).</p> <p>5- Hospital (P11) the largest hospital between all the hospitals in West Bank showed efficient performance.</p>
Campanella <i>et al.</i> , (2017)	Input-oriented TE analysis	Number of beds per patient, admitted, Number of medical doctors per patient admitted, Number of nurses per patient admitted	Risk-adjusted mortality for acute myocardial infarction, Risk-adjusted mortality for congestive heart failure, Risk-adjusted mortality	Tobit Regression	<p>1- Results revealed that Italian public hospitals had efficiency score of (77%) and SD of (0.12).</p> <p>2- The outputs slacks results shows that the following (Y1, Y2, Y3) outputs should be increased to be efficient even if each hospital in the study sample reached its input target value.</p> <p>3- Tobit regression test yielded that there is a positive relationship the lower case-mix index in the hospitals in the north of Italy.</p> <p>4- The conclusion of the researchers regarding the usage of DEA to measure technical efficiency of hospitals, that they supported the fact that DEA could help decision makers and policy makers' decisions.</p>

Sultan & Crispim (2016)	Input oriented CCR DEA	Number of beds, Physicians, Health Cadre, Administrative Cadre	for pneumonia  Inpatient, Outpatient, and Ambulance and Emergency departments	1- Constant Return to Scale (CRS) model 2- Variable Return to Scale (VRS) model	1- Results show that handling the slacks in out-patient visits of AL-Basheer hospital and Prince Hamza hospital offer additional hundreds of thousands of out-patient visits. 2- The slacks in emergency services of Princess Basma, AL-Nadeem and AL-Mafraq hospitals in addition to thousands of trauma cases, such benefits could be passed on to Syrian refugees within the available capacity. 3- The best annual average performance was achieved in 2013 and was shared by 3 efficient hospitals. 4- The year 2014 was shared by 8 productive and efficient hospitals to construct the efficient frontier, where the eight hospitals are all poorly efficient.
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**PSM and Ethical Behaviour**

Author/s	Method	Variables	Approach	Statistical Technique/s	Results
Ripoll & Schott (2020)	Survey Design	PSM and Justification of unethical behaviour	Quantitative	Descriptive statistical analysis /Confirmatory factor Analysis (CFA)/ Reliability analysis Cronbach's alpha and Joreskog's rho/ Correlation/ Multiple regression	1- Results report that there are no statistically significant impacts for gender or people with secondary studies. 2- University studies individuals, in contrast, are shown they less likely to reveal unethical judgment. 3- Individuals with a higher level of identification with efficiency are more likely to justify unethical behaviour, on the other hand.

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Meyer-Sahling, Mikkelsen & Schuster (2019)	Survey Experimental Design	PSM, ethical behavioural intent and willingness to report ethical problems	Quantitative	Correlation/ least squares (OLS) regression model	<p>4- Individuals who have higher levels of PSM are less likely to justify unethical behaviour.</p> <p>5- The interaction between identification with efficiency and PSM on unethical judgment is positive and statistically significant.</p> <p>6- Regression analyses based on vignette, however, indicate that individuals with high levels of PSM are neither less nor more likely to justify an integrity violation.</p> <p>7- There is a positive and significant main effect of the identification with public values in both vignettes.</p> <p>1- Researchers found that PSM stimulation improves willingness to report ethical problems to management, where PSM and willingness to report ethical problems are significantly correlated (<math>r = 0.12</math>) at the (<math>\alpha=0.001</math>) alpha level.</p> <p>2- The result of the OLS model indicate that employees whose PSM is activated prior to answering how willing they would be to report ethical problems to management have a significantly higher willingness to report (est. = 0.200, <math>P</math> two-sided <math>&lt; 0.001</math>)</p> <p>3- The result yielded that only the treatment has a positive significant effect at high levels of PSM, yet they did not find any significant effect at low levels of PSM</p>
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Ripoll & Ballart (2019)	Survey Design	PSM and ethical judgment	Quantitative	Structural equation modelling using a robust maximum-likelihood estimation/	<p>1- The regression paths are found matched with the correlations table, which confirm that individuals with a higher level of PSM will be less likely to judge or accept unethical behaviour.</p> <p>2- The standardized coefficients indicate that the direct effect of PSM on the acceptance of unethical behaviour is larger than the effect of external motivation.</p> <p>3- It found that individuals who feel and perceive that they have more autonomy, competence, and relatedness they tend to get higher levels of PSM.</p> <p>4- The effect of basic needs on external motivation was negative but not statistically significant (<math>p \leq 0.132</math>).</p> <p>5- The indirect effect on acceptance of unethical acts was negative but not statistically significant (<math>b = 0.022</math>, <math>p \leq 0.397</math>). In another words, this indicates that this indirect effect only occurs through PSM.</p>
Christensen & Wright (2018)	Three experimental studies/ Priming PSM and Ethical behaviour	PSM, Ethical behaviour, greed, and ethical decision-making	Quantitative	T test/ Standard Deviations	<p>1- The three experiments failed to find a link between PSM and ethical behaviour.</p> <p>2- No difference in the PSM or control priming conditions was found in the participant ethical decision-making (<math>p &gt; .05</math>)</p> <p>3- A two-sample t-test indicated that individuals in the PSM prime group were no less likely to cheat by reporting inflated scores (<math>t(253) = 1.373</math>, <math>p &gt; .05</math>)</p> <p>4- No difference (<math>p &gt; .05</math>) was found between the treatment and control group in either the global measure of</p>

PSM or the measure of the participant’s attitude toward greed

PSM and performance					
Author/s	Method	Variables	Approach	Statistical Technique/s	Results
Bayram & Zoubi (2020)	Survey Design	PSM, employee performance, and servant leadership	Quantitative	Reliability test, CFA, SEM, Path Analysis, Correlation test	<p>1- The values of (AVE) were between (0.5 to 0.7), but the civic duty dimension of PSM was under the acceptable upper limit with a value of (0.470).</p> <p>2- The test of internal association between variables using correlation matrix to measure the internal reliability, were all the factors found to be above the acceptable value of (0.70).</p> <p>3- Results of path analysis using Structural Equation Modeling (SEM) revealed that PSM has a significant positive relationship with the self-reported performance of employees, where the model fit results were as following: “(<math>\chi^2/df</math>) = 1.62, <math>CFI = 0.92</math>, <math>IFI = 0.92</math>, <math>TLI = 0.91</math>, <math>RMSEA = 0.048</math>, <math>SRMR = 0.065</math>, <math>PClose = 0.694</math>”.</p> <p>4- All the study hypotheses have been accepted positively, but the only one has been accepted negatively which is the relationship between servant leadership and employee performance (<math>\beta = -0.148</math>, <math>p &lt; 0.008</math>).</p> <p>5- Mediating hypothesis (indirect effect of PSM on employee performance), have been tested using bias-corrected bootstrapping and Bias-corrected confidence level of 0.90.</p>



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Stefurak, Morgan, & Johnson, (2020)	Survey	De-	PSM, satisfaction, and performance	Quantitative	CFA, EFA, Correlation test	<p>6- Results show that PSM has positive correlation with employee performance “(<math>\beta = 0.259, p &lt; 0.001, CI 0.176:0.357</math>)”.</p> <p>1- Exploratory Factor Analysis (EFA) via principal component analysis has been applied to measure the construct validity, and it results in single factor with (52.59%) explaining variance.</p> <p>2- The results of EFA yielded four factors explained (43.14%) of the variance.</p> <p>3- Researchers used CFA to assess the validity of the structure, the CFA results for the initial PSM factor structure was not a sufficient fit with the data sample of the study.</p> <p>4- Most of the variance of job satisfaction has been explained by the two sub-dimensions of PSM (Self-Sacrifice and Public Interest).</p> <p>5- The COM dimension was related to public service and policy, positively and moderately. Furthermore, all three factors were significantly related to job satisfaction, but not related to job performance.</p>
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Alreshoodi (2019)	Survey design	Design	PSM, performance behaviour (Individual Behaviour), Subjective Fits	Quantitative	Reliability analysis, CFA, SEM	<p>1- Results shows that PSM have a direct and positive relationship with in/extra-role behaviours.</p> <p>2- Validity and reliability tests results were satisfying and meet all the criteria of validity and reliability of model fitting “(<math>\chi^2 = 74.6</math> (<math>df = 21</math>; <math>p &lt; 0.001</math>); <math>CFI = 0.949</math>; <math>TLI = 0.913</math>; <math>SRMR = 0.032</math>; <math>RMSEA = 0.085</math>)”.</p> <p>3- Hypothesis testing using SEM has been applied with and without control variables demonstrates good fit “(<math>\chi^2 = 191.43</math> (<math>df = 4</math>; <math>p &lt; 0.001</math>); <math>CFI = 0.937</math>; <math>TLI = 0.926</math>; <math>SRMR = 0.051</math>; <math>RMSEA = 0.062</math>)”, and these results indicate a positive direct relationship between PSM and performance.</p>
Miao <i>et al.</i> (2019)	Survey design	Design	PSM, job performance, and organizational identification	Quantitative	CFA	<p>1- The results shwas that OI was found to explain the relationship between PSM and job performance in the Chinese civil employees.</p> <p>2- The study exposes that OI is a key mechanism that explains why employees with high levels of PSM perform at higher levels in their role, the more an individual identifies with the public sector organization they work for, the more they integrate the organization's beliefs and values into their self-concept.</p>

### 2.4.5 Aspects of similarity between the study and previous studies

#### This study is similar to previous studies in terms of:

**Study population:** This study is concordant with a study of Belrhiti *et al.* (2020); Seddighi, Nejad & Basakha, (2020); Lee (2020); and Sultan & Crispim (2018) in terms of the study population, whereas the current study and the aforementioned studies were applied in hospitals.

**Methodology:** The previous studies varied in terms of their use of methodologies, as the current study adopted the exploratory econometric survey was consistent with the previous studies of (e.g., Lee (2020); Ripoll & Schott (2020); Deng *et al.* (2019); Miao *et al.* (2019); Brænder & Andersen (2013)).

**Study tool/s:** This study agrees with almost all the previous studies regarding the survey as a tool for gathering primary data, for instant (Abbas & Kowang (2020); Ward & Miller-Stevens (2020); Ripoll & Schott (2020); Fan *et al.*, (2019); Joseph, Berry, & Deshpande (2010))

#### DEA variables (Inputs and outputs):

The current study is partially similar to Seddighi, Nejad & Basakha, (2020); Sultan & Crispim (2018) studies concerning the used DEA inputs (Hospital beds numbers, Doctors FTEs, Physicians, Administrative FTEs) and outputs (Inpatient days, Outpatient visits, Emergency care). On the other hand, the current study is very similar to Sultan & Crispim (2016) study, where the researcher yielded this similarity in selecting variables to the fact that this study gathered the data from the same source which is the JMoH.

#### 2.4.6 Aspects of dissimilarity between the study and previous studies

**This study is dissimilar from previous studies in terms of:**

**Study population:** This study is dissimilar in term of the chosen population from [Abbas & Kowang \(2020\)](#); [Miao \*et al.\* \(2019\)](#); and [Brænder & Andersen \(2013\)](#), as those previous studies varied in choosing its population, for example, banks, medical education hospitals, public service offices.

**Methodology:** This study is dissimilar from [Belrhiti \*et al.\* \(2020\)](#); who used a Qualitative multiple embedded case study design approach by adopting a Realist Evaluation Approach. Additionally, in the study of [Christensen & Wright \(2018\)](#), where researchers used three experimental designs and priming PSM and Ethical behaviour.

**Study tool/s:** This study is dissimilar from one previous study namely [Belrhiti \*et al.\* \(2020\)](#), where in this study researchers adopt the qualitative research approach and used a realistic evaluation cycle using focus groups by interviewing 17 individuals via in-depth interviews along with 7 focus and 8 groups and 8 discussions groups.

**DEA variables (Inputs and outputs):**

This study is dissimilar from [Seddighi, Nejad & Basakha, \(2020\)](#), who used life expectancy and Infant survival rate as input-output variables. Also, [Stefko, Gavurova & Kocisova \(2018\)](#) used a total number of medical equipment, magnetic resonance (MR) device numbers, and a number computed tomography (CT) devices as input variables.

#### 2.4.7 Commentary on previous studies

A literary review of studies in the past 11 years (2010-2021) related to study variables reveals the following:

- 1- The researcher did not find any Jordanian study that dealt with the concept of PSM and the extent of their impact on ethical behaviour within the limited knowledge of the researcher.
- 2- In foreign studies, the researcher noticed that they covered a wide range of (a) governmental organizations, including banks,

- the service sector, and health care institutions in public sector hospitals, and (b) business organizations (private sector organizations), including banks, service sector, and universities.
- 3- To our knowledge, this is the first study to examine the effect of PSM on ethical behaviour and organizational performance using two stage DEA in public sector hospitals, whether in Jordan or any country in the world.
  - 4- There are several previous studies that have studied ethical behaviour without specifying its studied dimensions (e.g., [Ripoll & Schott, 2020](#); [Meyer-Sahling, et al., 2019](#); [Christensen & Wright, 2018](#)).

This indeterminacy limits the value of this type of studies in two aspects: (a) the lack of discovery and explanation of individual differences between the dimensions of PSM in its relationships with other organizational variables, and (b) limiting the ability of the results of this type of studies to be generalized to the same studied sectors and organizations similar to those to which these studies were applied, and even to PSM itself due to the lack of explanation of the number and nature of the studied PSM dimensions, and thus the reader's inability to diagnose the extent to which the studied dimensions of PSM represent.

- 5- The vast majority of previous studies followed the quantitative research method, and used a questionnaire to collect data (e.g., [Ripoll & Schott, 2020](#); [Ripoll & Ballart, 2019](#); [Abbas & Kowang, 2020](#); [Joseph, Berry, & Deshpande, 2010](#)), and in all of these studies questionnaires were composed of pre-established questionnaires such as the PSM and ethical behaviour questionnaire. Although the current exploratory survey econometric study adopts a quantitative research approach and uses a questionnaire as a tool to collect study data, it had another advantage over previous studies in that it, however, it distinguished another feature from previous studies in that it designed and prepared its own questionnaire instead of using pre-made questionnaires, but it was largely enlightened by the relevant existing questionnaires, and the researcher's point

of view in that is to verify the suitability of the study tool for the study population and the Jordanian governmental context on the one hand and to ensure that all dimensions are covered from another hand.

#### **2.4.8 What distinguishes this study from other previous studies**

Based on the foregoing, the current study is distinguished from previous studies by the following:

1- Study the effect of PSM on ethical behavior in the Jordanian health sector, as one of the categories of Jordanian public sector institutions.

2- The correct sorting of the ethical behavior dimensions goes beyond the confusion between these dimensions.

3- Comprehensive coverage of PSM by studying its four main dimensions (Attraction to Public Service (APS), Self-Sacrifice (SS), Compassion (COM), and Commitment to Public Values (CPV)) and studying the three dimensions of ethical behavior (ethical behavior of self, ethical behavior of co-workers, and ethical leadership) at the same time, to discover the interactional relationships between the sub-variables where this point is one of the most important aspects of the current study from any previous study.

4- Using DEA as a tool to determine the efficiency and performance of the study population, which in the case of this study are Jordanian public sector hospitals, instead of using traditional performance measurement tools. Here lies an important point that contributed to formulating the problem of the current study and may contribute to bridging an analytical gap.

5- The analytical gap that this study seeks to bridge, is estimating the effect of PSM on performance using two stage DEA by combining both survey and published data. As the studies that examined the effect of PSM on performance did not go beyond being a descriptive survey of the performance of employees and not the organization as a whole in some cases.

That is why the current study was distinguished in that it went beyond that and employed the DEA method to measure the efficiency and performance of the Jordanian health sector

## **CHAPTER III: METHODOLOGY**

### **Prologue**

Following is a description of the study's method, population, and sample, the tools that were used, the indications of their validity and reliability, the determination of the study's variables and procedures, and the statistical treatments that were used to answer its questions. Given the nature of this study; this chapter will be divided into two parts, firstly the influence of PSM on ethical behavior and secondly, the influence of PSM on organizational performance.

### **3.1 PUBLIC SERVICE MOTIVATION AND ETHICAL BEHAVIOR**

#### **3.1.1 Study Approach (Method)**

The descriptive predictive approach was used; to reveal the level of PSM, and ethical behavior; In hospitals among Jordanian hospital staff, and to reveal the impact of their demographic variables on (PSM and its dimensions, and ethical behavior and its dimensions) in hospitals, and to reveal the predictive ability of PSM and its dimensions in ethical behavior and its dimensions. Hence, this part of the study followed a quantitative research methodology and a cross-sectional research design.

#### **3.1.2 Study population and sample size**

The population of this dissertation was the Jordanian public hospitals that work under the Jordanian Ministry of health (JMoH). However, the number of the hospitals is 30 public hospitals, where only 27 hospitals agreed as illustrated in (Table 3-1) to apply the study to them. The number of the Ministry of Health's entire staff is 58,000. While the number of hospital employees after excluding the hospitals that did not accept the study on them is 26,000 employees, as illustrated in Figure (3-1)

**Table 3-1: the hospitals' names included in the sample**

Name of Hospital
Al-Basheer
Al_Zarqa
Princess Basma
Prince Faisal Bin Al-Hussein
Jarash
Al-Hussein/Salt
Dr. Jameel Al-Totajji
Ma'an
Al-Iman
Al-Karak
Al-Nadeem
Prince Al-Hussein Bin Abdullah II
Princess Rahma
Al-Mafraq/Gynecology and Paediatrics Hospital
Al Ramtha
Princess Badea'
Princess Raya
Ghor Al-Safi
Mua'th Bin Jabal
Queen Rania Al-Abdullah
Al-Mafraq
Al-yarmouk
Al-Shuneh (South)
Abu-Obaidah
Princess Eiman/Ma'di
Princess Salma
Al-Rueshid

Therefore, the researcher has used many tools and references to determine the most appropriate, accurate, and representative sample size according to the study population. Therefore, the researcher shows these tools, as follows:

- 1- Krejcie & Morgan (1970)<sup>2</sup>, Table for “*Table for Determining Sample Size from a Given Population*”, as it shows in this table that the suitable sample size regarding the given population size

<sup>2</sup> Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.



( $N=26,000$ ), the number of ( $N$ ) is between ( $N=30,000$ ) and ( $N=20,000$ ), so, the researcher will take higher interval with ( $n=379$ ).

## 2- OpenEpi.V3 Software (Open-Source Statistics for Public Health)

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### Sample Size for Frequency in a Population

Population Size (for finite population correction factor or FPC) ( $N$ ):	26000
Hypothesized % frequency of outcome factor in the population ( $p$ ):	50%+/-5
Confidence limits as % of 100(absolute +/- %) ( $d$ ):	5%
Design effect (for cluster surveys- $DEFF$ ):	1

### Sample Size( $n$ ) for Various Confidence Levels

Confidence	Level (%)	Sample Size
	95%	379
	80%	164
	90%	268
	97%	463
	99%	647
	99.9%	1040
	99.99%	1431

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### Equation

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$$\text{Sample size } n = \lceil \frac{DEFF * N * p(1-p)}{[(d^2/Z^2)_{1-\alpha/2} * (N-1) + p * (1-p)]} \rceil$$


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### 3.1.3 Sampling technique

This research was conducted using a simple random sampling technique. Where the sample included all public workers in the Jordanian public hospitals. As shown above, the minimum calculated sample size was almost  $\approx 380$  (379), but however, the researcher distributed 1000 using random sampling and 791 questionnaires were received with a 70% response rate. After excluding invalid questionnaires, we kept only 567 responses. Nevertheless, the justification for distributing 810 is to avoid the potential issues of individuals responding. Still, the sample was very representative with a good response rate from the top-tier management to the first-level management. It is imperative to mention that verbal informed consent was taken from the respondents and all details regarding the purpose of

data collection and the research work were shared in a cover letter attached with the instrument (see Appendix 1). The measurement unit in this part of the study was the employees/workers in the Jordanian public hospitals since the study will focus on studying the motivation of the public workers and how it influences their ethical behavior.

**Figure 3-1: Study population and sample representation**



*Source: designed by researcher based on the data has been given by the JMoh*

### 3.1.4 Sociodemographic Characteristics

The researcher conducted a Frequency Distribution Analysis (FDA) with the aim of identifying the most important personal characteristics (Social and Demographic Characteristics) of the study sample members. In the following paragraphs, the researcher presents the most important results.

The analysis (Table 3-2) revealed that in terms of gender, the disparity between the numbers of genders was very close, for instance, the number of males reached (284) employees, or about (50.09%) of the sample members, and the number of female employees was (283), who constituted (49.91%) of the study sample members. Regarding educational level, holders of a bachelor's degree constituted nearly

more than half of the sample; They were (307) employees, i.e. (54.14%) of the total number of respondents (Table 3-2), followed by employees holding a master's degree, whose number was (182) employees (32.10%). While the number of employees holding a doctorate was the least with 78 employees (13.76%).

With regard to the age group, the age of the largest number of employees ranged between (36) and (45) years, and their number was (190) employees (33.51%), followed by employees from the age group (25-35) years, whose number was (164), they constitute (28.92%) of the total study sample members. Relatively young employees, i.e., employees under the age of (25) years, represented the lowest number in the study sample (6.88%).

The practical experiences of the study sample varied, and to some extent, the number of employees with experience categories of (5) years or less is (83; 14.64%). However, employees with the most experience fall into the category of 17 years and above (183; 32.28%), and those with less than 5 years of experience were the lowest (83; 14.64%).

Table 3-2: Sociodemographic Characteristics

IV and Levels	Frequency	Percent
<b>Gender</b>		
Male	284	50.09
Female	283	49.91
<b>Educational Level</b>		
Bachelor's Degree	307	54.14
Master's Degree	182	32.10
Doctorate Degree	78	13.76
<b>Age</b>		
Less than 25	39	6.88
at 25 to 35	164	28.92
at 36 to 45	190	33.51
at 46 to 55	108	19.05
at 56 and above	66	11.64
<b>Practical Experience</b>		
5 years or less	83	14.64
at 6 to 11 years	121	21.34
at 12 to 16 years	180	31.75
at 17 years and above	183	32.28
<b>Administrative States</b>		
Yes	185	32.63
No	382	67.37
<b>Job Title</b>		
Doctors	79	13.93
Registered Nurse	71	12.52

IV and Levels	Frequency	Percent
Administrative	141	24.87
Director of the (Department/Service)	174	30.69
Pharmacists	38	6.70
Other (Public Health technician/Radiology Technician/Tailors/Chefs)	64	11.29

Concerning the administrative states, it is clear from Table 3-2 that most of the study sample is not in an administrative position (382; 67.37%), on the contrary, employees with administrative states are less (185; 32.63%). Moreover, the study sample job titles were vary; with (175; 30.69%) directors of the (department/service), followed by (141; 24.87%), (79;13.93%) doctors, (71; 12.52%) registered nurses, and in the lowest are Other (Public Health technician/Radiology Technician/Tailors/Chefs) with (64; 11.29%).

### 3.1.4 Instrument

A self-reported questionnaire has been delivered through the field distribution by the researcher to the hospitals' workers from all organizational levels and job titles (I.e., doctors, nurses, managers, etc.). The researcher at the time of data collection tried to distribute a portion of the questionnaires through internal e-mail to the hospitals that are far away from the capital Amman, after taking permission to access these employees.

This e-mail consisted of a brief description of the aim of the study and information related to data collection and clarify data confidentiality and use only for the purposes of pure scientific research. However, almost all the hospitals refused to collect the data using online forums, which put the necessity to travel to Jordan and collect the data from each hospital by the researcher, given the fact distance geographically as shown in the next figure (Figure 3-2).

All the variables' items included in the questionnaire were measured by 5-point Likert- scoring system, namely: (5) Completely/Strongly agree, (4) Agree, (3) Neutral/ Undecided, (2) Disagree, and (1) Completely/ Strongly disagree, as is illustrated in [Figure \(3-3\)](#). Scholars have strongly recommended using a 5-point Likert scoring system in view of the fact that will decrease the level of dissatisfaction of respondents answering and increase the response rate

and response quality (Babakus & Mangold, 1992). Additionally, some other researchers (e.g., Finstad, 2010; Leung, 2011) argued that is better to use a 5-point scale for a larger study (N>100) but in a smaller study (N<100) to use a 7-point scale for better data distribution.

Figure 3-2: Hospitals’ geographical distribution

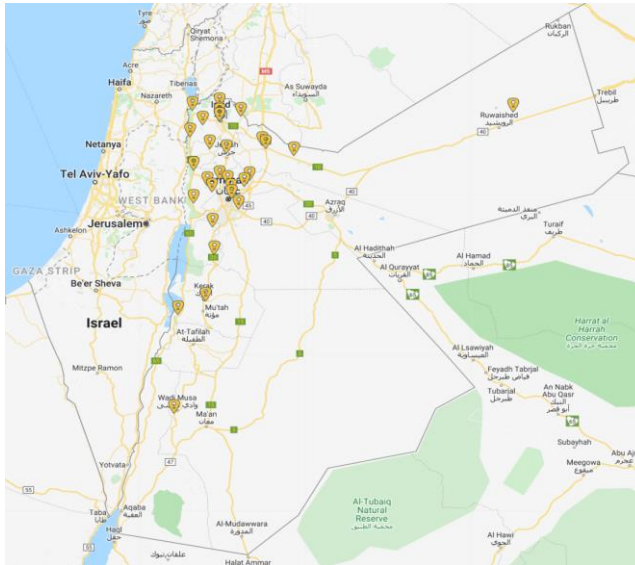
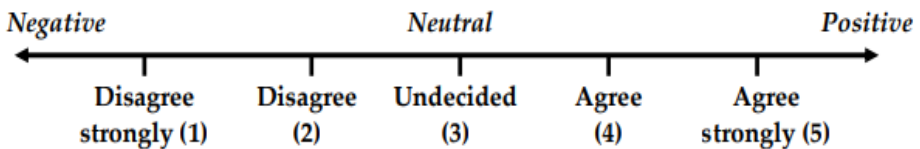


Figure (3-3): 5-point Likert- scoring system



Similarly, using a 4-point Likert scoring system does not allow the respondents to give a neutral answer and that may distort the outcomes Khan, Polonsky, & Vincent (2016). Therefore, in the case of this study, the sample is more than 100 cases, so the

researcher had chosen the 5-point scale as the rating scale for the questionnaire questions.

The preliminary part of the questionnaire (see Appendix 2) has consisted of demographic factors, for instance, sex, gender, age, educational level, organizational status, and years of experience in current job position, hospital name. The second part of the questionnaire comprised of questions regarding the degree of agreement on PSM.

The PSM scale has been reproduced and redesigned to suit the reality of the study population, which represents the Jordanian public hospitals, based on an international scale that has been developed by [Kim \*et al.\*, \(2010, 2013\)](#). The scale of [Kim \*et al.\*, \(2013\)](#) has been tested in twelve countries and tested among (n=2,868) public employees in many different local governments. The latest research recommends that such global measures have several advantages over the current multi-dimensional measures of PSM [Wright, et al., 2016](#)).

PSM scale will be split up into four sub-variables and they are namely (Attraction to Public Service, Self-Sacrifice, Compassion, Commitment to Public Values). Hence, it must be noted that [Perry & Vandenberg \(2015\)](#) stated that the international scale of [Kim \*et al.\*, \(2013\)](#) represents an enhancement and improvements on the original instrument developed by [\(Perry, 1996\)](#).

However, [Perry & Wise \(1990\)](#) suggested that PSM can be divided into three bases, the rational base, norm-based, and affective motives base. Since this thesis is focusing on the desire of public workers to pursue the common good and further the public interest, we choose *Norm-based motives* and *Affective motives*. So, the researcher will be omitting the sub-variable (Attraction to Policy Making APM), by virtue of that, does not suitable for the Jordanian culture to ask them about their opinion in the policymaking process in Jordan, and this idea is supported by [i.e., [Liu, Tang & Zhu, \(2008\)](#)] who suggested that the scale of [\(Perry, 1996\)](#) need to recognize the potential difference between cross cultures [\(Wright, et al., 2013\)](#).

Hence, it is wildly acceptable to drop or compound one or more of these dimensions [\(Wright, 2008\)](#). In this regard, many researchers had studied PSM, and they underscore that APS corroborated not

statistically satisfied as a dimension of PSM, and with the wording of the dimension items (Ritz, 2011).

As a consequence, many studies don't study the APM dimension Homberg & Costello (2019). For instance, Brænder & Andersen (2013) investigate the influence of deployment to war on PSM of Danish combat soldiers, they choose to omit the APM dimension, but they justify that with many reasons. First, they argue that APM is a rational-based dimension, and deployment to war is more likely to influence the altruistic and service-oriented elements of PSM which can be seen as normative-based and affective-based motives. Second, they stated that as a soldier they already serving their country and that could not affect their attraction to policy making directly. Hence, Coursey, Perry, Brudenry, and Littlepage (as cited in Homberg & Costello (2019), also argued that is not necessary to measure APM in such a context.

In the third part of the questionnaire, respondents had been required to answer questions depending on their agreement or disagreement degree on the ethical behavior in the hospitals where they work. Ethical behavior in this study is split into three sub-variables. The first two sub-variables are (Ethical behavior of self and Ethical behavior of co-workers) and they will be measured by using Deshpande, Joseph & Prasad (2006) scale. The third sub-variable will be Ethical Leadership and it will be measured by the Ethical Leadership Questionnaire (ELQ) that was developed and validated by (Yukl *et al.*, 2013).

Last of all, with the purpose of controlling and decreasing the social desirability bias while measuring PSM and ethical behavior of the workers in the Jordanian public hospitals, overclaiming scales have been used to identify the over-claimers in this thesis, by using the proposed scale of Randall & Fernandes (1991), noting that this scale is widely used when it comes to measuring ethical behavior in hospitals and in various other environments such as universities, colleges, not-for-profit organization, (e.g., Schoderbek & Deshpande ,1996; Deshpande , et al., 2006; Joseph, et al., 2009,2010; Dimitriou & Ducette, 2018). The respondent has been asked to rank their familiarity degrees with different types of subjects, such as films, products, TV series, and clothes brands on a Five-point Likert scale (3 = familiar with both of them, 2 = familiar with both of them, 1 = Not familiar with any

of them). Knowing that each category will have one fake item – *A Non-Existent Item*. Therefore, the hypothesis of this test will be as follows:

**H0.1:** Over-claimers report a higher level of ethical behavior.

**H0.2:** Over-claimers report a higher level of public service motivation.

Furthermore, the researcher put Common Method Variance (CMV) into consideration, and the reason why is because this concern becomes stronger when both the focal explanatory variable and dependent variable/s will be measured from the same respondent Podsakoff & Organ (1986). Thus, the use of cross-sectional survey data may create the potential for CMV bias to create spurious correlations Kim, (2016); Krosnick, (1999); Lindell & Whitney, (2001); Podsakoff, MacKenzie & Podsakoff, (2012).

Consequently, to avoid this problem, (*ex-ante*) research instrument design strategy is taken into consideration, by adopting the (Remedy 2) solution suggested by (Chang, et al., 2010). Where the (Remedy 2) solution procedure can be done by assuring the anonymity and confidentiality of the study respondents and clarifying to them that there is no right or wrong answer, they should answer the questions with the highest degree of truthfulness and honesty, without being influenced responses. According to Chang, et al. (2010), this procedure can make questionnaire items less likely to be correlated with CMV. We further applied an important procedure with the purpose of controlling the common method bias, which is the technique that has been put forward by Podsakoff *et al.*, (2003), which is the *Improving Scale Items* technique, by avoiding using vague terms or statements in each item; defining the ambiguous or difficult to understand terms for the respondents, and finally avoiding the double-barrelled questions.



### **3.1.5 Public Service Motivation Validity and reliability indicators**

#### **3.1.5.1 Face validity**

The face validity of PSM in Jordanian public hospitals has been verified, by presenting it to a group of arbitrators consisting of multiple arbitrators with experience and deep knowledge in the fields of public Administration, Law, Economics, Finance, Statistics, and Curriculum and methods, who hold academic ranks in academic institutions as it shows in Appendix 3; with the aim of expressing their views on the content of the scale's paragraphs in terms of clarity of the content of its dimensional paragraphs, the integrity of the linguistic formulation of its dimensional paragraphs, the substantive affiliation of the paragraphs to its own dimensions, and any modifications and observations they deem appropriate. Nevertheless, all comments of the arbitrators were taken into consideration in light of the results of verifying the content validity of the paragraphs PSM. Thus, the number of paragraphs of the scale in its final form consists of sixteen paragraphs, distributed over four dimensions.

#### **3.1.5.2 PSM Exploratory factor Analysis**

The exploratory factor analysis validity was verified by performing its steps three times as follows:

##### **First: Results for the first time according to the following rationing steps:**

To reveal the components (dimensions) included in the scale of PSM. The exploratory factor analysis (EFA) was carried out according to the (*Kaiser Normalization and Promax Rotation*), which is based on the Extraction Method of Principal Component Analysis (PCA), which is limited to five components, due to the inclusion of the scale in its theoretical form on four dimensions according to the covariance matrix using SPSS v28 as follows:

(1) Indicators based on stability ([Hattie, 1985](#)): including A criterion ([Nunnally & Bernstein, 1994](#)) to test the homogeneity of the items of the scale, whose value is (0.30). Also, the criterion of ([Kline,](#)

2015) is one of them, even if it does not include it. To test the homogeneity of the items on a scale that has a value of (0.20); this is for the values of the corrected correlation coefficients for the sixteen items of the PSM scale, according to Likert's method in gradation with the total score of its scale, as shown in Table 3-3.

**Table 3-3: The values of the corrected correlation coefficients for the items of the PSM scale before the EFA for the first time**

Dimension & Item ID	Context for items of PSM Scale	Corrected Item-Total Correlation
<b>APS: Attraction to Public Service</b>		
1	Helping to improve the public service is one of the concerns that prevail among the hospital employees	0.42*
2	I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community	0.50*
3	My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary conditions	0.63*
4	I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector	0.41*
5	Working in a public hospital instead of a private hospital is a desire, even if it includes less advantages	0.46
<b>SS: Self-Sacrifice</b>		
1	I consider putting civic duty before my self is a vital role for public healthcare sector workers	0.74
2	Much of what I do is for a cause bigger than me as an employee in the hospital	0.74*
3	I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort	0.69*
4	If my manager does not reward my commitment, I believe that there is no reason to make any extra effort	0.60*
<b>COM: Compassion</b>		
1	To me, helping people who are in trouble, or who are treated unfairly, is very important	0.71*
2	I seldom think about the welfare of other people whom I do not know personally	0.35
3	I have little compassion for people in need who are unwilling to take the first step to help themselves	0.08*
<b>CPV: Commitment to Public Values</b>		
1	I believe that it is important that public employee account for all the cost/expenses they make	0.54
2	To me, serving public interests is more important than helping other people	0.60
3	My mission is not asking about activities legitimacy but simply do the job	0.45
4	I think that what is really matters in this work is expertise, not ethics	0.50*

\*  $p \leq 0.05$

+ **CITC**: Less than criterion (0.30) & less than criterion (0.20)

It is clear from Table 3-3 that the values of the corrected correlation coefficients for the items of PSM with its scale ranged between (0.35-0.74) after excluding the item (with the number: 3) after empathizing, because its corrected correlation coefficient with its scale is less than a standard (0.30) and less than a standard (0.20).

(2) Indicators based on exploratory factor analysis (Hattie, 1985): including; commonality criterion, which considers the paragraph to be fully saturated in one dimension only when its value is greater than (0.59), as well as which considers the paragraph to be acceptable saturation in one dimension somewhat when its value is greater than (0.49) approved in the help guide in the package program SPSS V28 for (Green et al., 1977; Hattie & Hansford, 1982; Watkins & Hattie, 1980), as shown in Table 3-4.

**Table 3-4: The values of the commonalities of PSM items during the EFA for the first time**

Dimension & Item ID	Context for items of PSM Scale	Extracted Communalities
<b>APS: Attraction to Public Service</b>		
1	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>	0.68
2	<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>	0.76
3	<i>My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary conditions</i>	0.53
4	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>	0.64
5	<i>Working in a public hospital instead of a private hospital is a desire, even if it includes less advantages</i>	0.94
<b>SS: Self-Sacrifice</b>		
1	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>	0.80
2	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>	0.81
3	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>	0.66
4	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>	0.52

**COM: Compassion**

*To me, helping people who are in trouble, or who are treated unfairly, is very important*



Dimension & Item ID	Context for items of PSM Scale	Extracted Communalities
1		0.69
	<i>I seldom think about the welfare of other people whom I do not know personally</i>	
2		0.45*
	<i>I have little compassion for people in need who are unwilling to take the first step to help themselves</i>	
3		0.97
<b>CPV: Commitment to Public Values</b>		
	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>	
1		0.73
	<i>To me, serving public interests is more important than helping other people</i>	
2		0.72
	<i>My mission is not asking about activities legitimacy but simply do the job</i>	
3		0.70
	<i>I think that what is really matters in this work is expertise, not ethics</i>	
4		0.51

\* **Goodness-of-fit:** Communality greater than the criterion (0.59) or **Acceptable:** Communality greater than the criterion (0.49)

It is clear from Table 3-4 that the extracted communalities values of the PSM scale items ranged between (0.51-0.94) after excluding the item (with number: 2) from after COM Because its extracted commonality value is less than the standard (0.50).

(3) Indicators based on exploratory factor analysis (Hattie, 1985): including; (Gorsuch, 1983) steps for exploratory factor analysis: it is not permissible to adopt the paragraph with saturation less than (0.40), or the false dimension (Trivial Factor) consisting of two paragraphs or less may not be adopted, or the paragraph may not be saturated on two dimensions with values greater than (0.40), or the non-membership of the paragraph to the sorted component due to the non-objectivity of the consistency of its content with the content of the rest of the sorted component paragraphs within it, as shown in Table 3-5.

**Table 3-5: The saturated values of PSM items during the EFA for the first time**

Domain &	Context for items	Component					Reasoning of deletion
		SS	CP	AP	Tivial	Tivial	
<b>SS: Self-Sacrifice</b>							
	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>	2	09				
	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>	1	09				
	<i>To me, helping people who are in trouble, or who are treated unfairly, is very important (Previously; belongs to COM)</i>	1	07				
	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal</i>	3	07				
	<i>My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary</i>	3	06				
	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>	4	05				
<b>CPV: Commitment to Public Values</b>							
	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>	1	08				
	<i>My mission is not asking about activities legitimacy but simply do the job</i>	3	08				
	<i>To me, serving public interests is more important than helping other people</i>	2	07				
	<i>I think that what is really matters in this work is expertise, not ethics</i>	4	06				
	<i>I seldom think about the welfare of other people whom I do not know personally (Previously; belongs to COM)</i>	2	05				
<b>APS: Attraction to Public Service</b>							
	<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help</i>	2	08				
	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>	4	08				
	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>	1	07				
<b>Tivial COM</b>							
	<i>I have little compassion for people in need who are unwilling to take the first step to help themselves</i>	3			098		CITC; less than criteria [(0,30) & (0,20)] &
<b>Tivial APS</b>							
	<i>Working in a public hospital instead of a private hospital is a desire, even if it includes less advantages</i>	5			091		Tivial Factor

It is clear from Table 3-5 that it is necessary to drop the paragraph (with the number: 3) from the dimension of COM; because it constitutes a pseudo-dimension according to *Gorsuch's* steps to standardize tools using exploratory factor analysis, and because the value of its corrected correlation coefficient is less than the criterion (0.30) and less than the criterion (0.20) according to its result in Table 3-3. It becomes clear the necessity of dropping paragraph (no. 5) of APS. For it constitutes a pseudo-dimension following *Gorsuch's* steps for codifying instruments using exploratory factor analysis.

Table 3-6 shows that in the exploratory factor analysis for the first time; five components that have a latent root more than the reference value (1) explain together the amount of (69.37%) of the total cumulative explained variance of the paragraphs of PSM scale, with an explanatory variance rate for the first component that exceeds (20%), where its value reached (39.04%).

**Table 3-6: The results of the EFA for PSM items for the first time**

Component	Total Variance Explained					
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	8.17	39.04	39.04	6.12	38.24	38.24
2	3.03	14.47	53.50	2.37	14.83	53.07
3	1.43	6.81	60.31	1.06	6.65	59.72
4	1.12	5.33	65.64	0.81	5.04	64.75
5	1.03	4.91	70.55	0.74	4.62	69.37
6	0.82	3.93	74.48			

Table 3-7 shows the values of the correlation coefficients between the components that the EFA sorted for the paragraphs of PSM, followed by the result of the Kaiser-Meier-Olkin (KMO) test, which has a value of (0.91), which indicates the adequacy and appropriateness of the scale data for the exploratory factor analysis in the study sample, followed by a test result Bartlett sphericity is (4128.81) insignificance ( $\alpha = 0.05$ ); this indicates that there is at least one statistically significant relationship ( $\alpha = 0.05$ ) between the components that the exploratory factor analysis sorted for the scale items.

**Table 3-7: The results of the Kaiser-Meyer-Olkin test and Bartlett sphericity test and the values of the correlation coefficients for the components of the EFA of the items of PSM for the first time**

Component	1	2	3	4
2	0.52*			
3	0.50*	0.11*		
4	0.19*	-0.09*	0.21*	
5	0.35*	0.23*	0.31*	-0.01

KMO and Bartlett's Test <sup>(1)</sup>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. $\chi^2$	df	Sig.
0.91	4128.81*	120	0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

**Secondly: the results of the second time according to the following rationing steps:**

To reveal the components (dimensions) included in the scale of PSM; EFA was carried out according to the oblique rotation method based on the method of extracting the analysis of the main components, which is ultimately restricted to three components in light of the result of the EFA for the first time, despite the fact that the scale in its theoretical form includes four dimensions according to the accompanying variances matrix using the SPSS v28 program as follows:

(1) Indicators based on stability: including; (Nunnally and Bernstein, 1994) criterion for testing the homogeneity of the scale items, which has a value of (0.30), and the return criterion is considered one of them, although it does not include the test for the homogeneity of the items of the scale, whose value is (0.20), for the values of the corrected correlation coefficients for the items of PSM scale, which included of fourteen items according to Likert's method is ranked with the total score of its scale, as shown in Table 3-8.

**Table 3-8: The values of the corrected correlation coefficients for the items of PSM with its scale before the EFA for the second time**

Dimension & Item ID	Context for items of PSM Scale	Corrected Item-Total Correlation
<b>APS: Attraction to Public Service</b>		
1	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>	0.39*
2	<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>	0.47*
3	<i>My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary conditions</i>	0.63*
4	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>	0.38*
<b>SS: Self-Sacrifice</b>		
1	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>	0.73*
2	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>	0.74*
3	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>	0.69*
4	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>	0.60*
<b>COM: Compassion</b>		
1	<i>To me, helping people who are in trouble, or who are treated unfairly, is very important</i>	0.70*
2	<i>I seldom think about the welfare of other people whom I do not know personally</i>	0.39*
<b>CPV: Commitment to Public Values</b>		
1	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>	0.57*
2	<i>To me, serving public interests is more important than helping other people</i>	0.63*
3	<i>My mission is not asking about activities legitimacy but simply do the job</i>	0.48*
4	<i>I think that what is really matters in this work is expertise, not ethics</i>	0.53*

\*  $p \leq 0.05$ 

It is clear from Table 3-8 that the values of the corrected correlation coefficients for the items of the PSM scale are range between (0.38-0.74).

(2) Indicators based on EFA: including items communalities criterion that considers the paragraph to be completely saturated in one dimension only when its value is greater than (0.59), and which



considers the paragraph to be somewhat saturated in one dimension when its value is greater than (0.49), as shown in Table 3-9.

**Table 3-9: communalities values of the PSM scale items during the EFA for the second time**

Dimension & Item ID	Context for items of PSM Scale	Extracted Communalities
<b>APS: Attraction to Public Service</b>		
1	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>	0.68
2	<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>	0.72
3	<i>My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary conditions</i>	0.51
4	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>	0.66
<b>SS: Self-Sacrifice</b>		
1	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>	0.77
2	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>	0.79
3	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>	0.65
4	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>	0.50
<b>COM: Compassion</b>		
1	<i>To me, helping people who are in trouble, or who are treated unfairly, is very important</i>	0.68
2	<i>I seldom think about the welfare of other people whom I do not know personally</i>	0.43*
<b>CPV: Commitment to Public Values</b>		
1	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>	0.69
2	<i>To me, serving public interest is more important than helping other people</i>	0.71
3	<i>My mission is not asking about activities legitimacy but simply do the job</i>	0.68
4	<i>I think that what is really matters in this work is expertise, not ethics</i>	0.51

\* **Goodness-of-fit:** Communality greater than the criterion (0.59) or **Acceptable:** Communality greater than the criterion (0.49)

It is clear from Table 3-9 that the prevalence values of the items on the scale of motivation towards the extracted public service ranged between (0.50-0.79) after excluding the item (with number: 2) after empathy; for this reason, its extracted commonality value is less than the standard (0.50).

(3) Indicators based on EFA: including; [Gorsuch's \(1983\)](#) steps for EFA: It is not permissible to adopt a paragraph with saturation lower than (0.40), or it is not permissible to adopt a false dimension consisting of two paragraphs or less, or it is not permissible to adopt a paragraph on two dimensions with values greater than (0.40), or the membership of the paragraph To the component that is sorted within it due to the non-objectivity of its content consistent with the content of the rest of the paragraphs of the component sorted within it, as shown in Table 3-10.

It is clear from Table 3-10 the need to drop the item (with the number: 2) from the dimension of COM, which is sorted within the component of CPV; because its content is not consistent with the contents of the rest of the sorted paragraphs within the CPV component, and because the value of its commonalities is not acceptable if it is less than (0.50); which means that it does not match the one-dimensionality well according to its result in Table 3-9. It is clear that the paragraph (with number: 1) should be dropped from the dimension of COM also, sorted within the SS component because its content is not consistent with the contents of the rest of the sorted paragraphs within the SS component. Where it becomes clear the necessity of dropping the paragraph (the number: 3) from the APS variable which is classified within the component of SS. Because its content is not consistent with the contents of the rest of the sorted paragraphs within the SS component.

**Table 3-10: The values of PSM items saturation during the EFA for the second time**

Dimension & Item ID	Context for items of PSM Scale	Component			Reasoning of deletion
		SS	CPV	APS	
<b>SS: Self-Sacrifice</b>					
	Much of what I do is for a cause bigger than me as an employee in the hospital	2	0.92		
	I consider putting civic duty before my self is a vital role for public healthcare sector workers	1	0.91		
	To me, helping people who are in trouble, or who are treated unfairly is very important (Previously; belongs to COM)	1	0.81		Belongs to COM
	I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort	3	0.78		
	My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary conditions (Previously; belongs to APS)	3	0.60		Belongs to APS
	If my manager does not reward my commitment, I believe that there is no reason to make any extra effort	4	0.59		
<b>CPV: Commitment to Public Values</b>					
	My mission is not asking about activities legitimacy but simply do the job	3	0.85		
	I believe that it is important that public employee account for all the cost/expenses they make	1	0.83		
	To me, serving public interests is more important than helping other people	2	0.75		
	I seldom think about the welfare of other people whom I do not know personally (Previously; belongs to COM)	2	0.67		Do not fit well with the factor 'solution' & Belongs to COM
	I think that what is really matters in this work is expertise, not ethics	4	0.67		
<b>APS: Attraction to Public Service</b>					
	I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector	4	0.88		
	I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community	2	0.77		
	Helping to improve the public service is one of the concerns that prevail among the hospital employees	1	0.76		

\* Goodness-of-fit: Communalities greater than the criterion (0.59) or *Acceptable*: Communalities greater than the criterion (0.49)

Table 3-11 shows that the EFA in the second time; where the results sorted three components that have a latent root more than the reference value (1) that together explain the amount of (64.34%) of the total cumulative explanatory variance of the paragraphs of the scale of PSM, with an explanatory variance rate for the first component that exceeds (20%), where its value amounted to (43.27%).

**Table 3-11: Results of the EFA of the PSM items for the second time**

Component	Total Variance Explained					
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	7.81	43.27	43.27	5.88	41.97	41.97
2	2.75	15.23	58.50	2.19	15.61	57.58
3	1.21	6.71	65.22	0.95	6.76	64.34
4	0.85	4.68	69.90			

Table 3-12 shows the values of the correlation coefficients between the components that were sorted by the EFA for the PSM items, followed by the KMO test result, which has a value of (0.91), which indicates the appropriateness of the scale data for exploratory factor analysis, followed by the Bartlett test result for sphericity of Its value is (3854.23) with statistical significance ( $\alpha = 0.05$ ); this indicates that there is at least one statistically significant relationship ( $\alpha = 0.05$ ) between the components that the EFA sorted for the scale items.

**Table 3-12: The results of the Kaiser-Meyer-Alkin test and the Bartlett test for sphericity and the values of the correlation coefficients for the components of the EFA of the PSM scale items in the second time**

Component	1	2
2	0.51*	
3	0.50*	0.11*
KMO and Bartlett's Test <sup>(1)</sup>		
Kaiser-Meyer-Olkin	Bartlett's Test of Sphericity	
Measure of Sampling Adequacy	Approx. $\chi^2$	df Sig.
0.91	3854.23*	91 0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

### **Third: the results of the third time according to the following rationing steps:**

To reveal the components (dimensions) included in the scale items of PSM. The EFA was carried out according to the oblique rotation method based on the method of extracting the analysis of the main components, which is ultimately restricted to three components in light of the result of the exploratory factor analysis the second time, although the scale in its theoretical form includes four dimensions according to the accompanying variances matrix using the SPSS v28 program as following:

(1) Indicators based on stability: including; (Nunnally and Bernstein, 1994) criterion for testing the homogeneity of the scale items, which has a value of (0.30), and the return criterion is considered one of them, although it does not include the test for the homogeneity of the items of the scale, which has a value of (0.20), for the values of the corrected correlation coefficients for the items of the service motivation scale The general number of eleven items according to Likert's method is ranked with the total score of its scale, as shown in Table 3-13.

**Table 3-13: Corrected correlation coefficient values for the items of the PSM scale before the EFA for the third time**

Dimension & Item ID	Context for items of PSM Scale	Corrected Item-Total Correlation
<i>APS: Attraction to Public Service</i>		
1	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>	0.40*
2	<i>Support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>	0.47*
4	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>	0.38*
<i>SS: Self-Sacrifice</i>		
1	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>	0.70*
2	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>	0.72*
3	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>	0.69*
4	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>	0.58*
<i>CPV: Commitment to Public Values</i>		
1	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>	0.57*
2	<i>To me, serving public interest is more important than helping other people</i>	0.62*
3	<i>My mission is not asking about activities legitimacy but simply do the job</i>	0.48*
4	<i>I think that what is really matters in this work is expertise, not ethics</i>	0.50*

\*  $p \leq 0.05$

It is clear from Table 3-13 that the values of the corrected correlation coefficients for the PSM scale items ranged between (0.38-0.72).

(2) Indicators based on EFA: including items communalities criterion which considers the paragraph to be completely saturated in one dimension only when its value is greater than (0.59), and also which considers the paragraph to be somewhat saturated in one dimension when its value is greater than (0.49), as shown in Table 3-14.

**Table 3-14: the values of PSM items' communalities during the EFA for the third time**

Dimension & Item ID	Context for items of PSM Scale	Extracted Communalities
<i>APS: Attraction to Public Service</i>		
1	Helping to improve the public service is one of the concerns that prevail among the hospital employees	0.68
2	I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community	0.73
4	I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector	0.67
<i>SS: Self-Sacrifice</i>		
1	I consider putting civic duty before my self is a vital role for public healthcare sector workers	0.79
2	Much of what I do is for a cause bigger than me as an employee in the hospital	0.82
3	I would agree to an effective plan to make a better life for society and the less fortunate people even if it will cost me personal loss, or time, money, and effort	0.69
4	If my manager does not reward my commitment, I believe that there is no reason to make any extra effort	0.52
<i>CPV: Commitment to Public Values</i>		
1	I believe that it is important that public employee account for all the cost/expenses they make	0.70
2	To me, serving public interests is more important than helping other people	0.72
3	My mission is not asking about activities legitimacy but simply do the job	0.72
4	I think that what is really matters in this work is expertise, not ethics	0.52

It is clear from Table 3-14 that the values of extracted communalities of PSM scale items PSM ranged between (0.52-0.82); including that each paragraph out of eleven paragraphs is saturated within one component at most.

(3) Indicators based on exploratory factor analysis: including; Gorsuch's (1983) steps for exploratory factor analysis: It is not permissible to adopt a paragraph with saturation lower than (0.40), or it is not permissible to adopt a pseudo-dimension consisting of two paragraphs or less, or it is not permissible to adopt a paragraph on two dimensions with values greater than (0.40), or the membership of the paragraph To the component that is sorted within it due to the non-objectivity of the consistency of its content with the content of the rest

of the paragraphs of the component that is sorted within it, as shown in Table 3-15.



**Table 3-15: PSM items saturation values during the EFA for the third time**

Dimension & Item ID	Context for items of PSM Scale	Component		
		CPV	SS	APS
<b>CPV: Commitment to Public Values</b>				
	<i>My mission is not asking about activities legitimacy but simply do the job</i>			
	3	0.88		
	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>			
	1	0.83		
	<i>To me, serving public interests is more important than helping other people</i>			
	2	0.75		
	<i>I think that what is really matters in this work is expertise, not ethics</i>			
	4	0.70		
<b>SS: Self-Sacrifice</b>				
	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>			
	2		0.91	
	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>			
	1		0.89	
	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>			
	3		0.79	
	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>			
	4		0.60	
<b>APS: Attention to Public Service</b>				
	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>			
	4			0.88
	<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>			
	2			0.78
	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>			
	1			0.77



It is clear from Table 3-15 that all PSM items' saturation values are greater than (0.40) within the component (dimension) of each of them. Thus, the scale of PSM has become in its final form in the light of the indications of construct validity, consisting of eleven items. It is divided into three dimensions; namely: CPV, and it has four paragraphs; its saturations range between (0.70-0.88), then SS dimension, and it has four paragraphs; its saturations range between (0.60-0.91), then the APS, and it has three paragraphs; its saturations range between (0.77-0.88).

Table 3-16 shows that the EFA for the third time; has sorted three components that have a latent root more than the reference value (1) that together explain the (68.62%) of the total cumulative explained variance of the PSM scale items, with an explanatory variance rate for the first component that exceeds (20%), where its value reached (43.88%).

**Table 3-16: The results of the EFA of PSM scale items for the third time**

Component	Total Variance Explained					
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	6.38	43.88	43.88	4.71	42.84	42.84
2	2.51	17.28	61.17	1.95	17.73	60.57
3	1.16	7.96	69.13	0.89	8.05	68.62
4	0.78	5.37	74.50			

Table 3-17 shows the values of the correlation coefficients between the components that were sorted by the EFA for PSM items, followed by the result of the KMO test, which has a value of (0.86), which indicates the appropriateness of the scale data for EFA, followed by the result of the Bartlett test for sphericity of which is Its value is (2874.30) with statistical significance ( $\alpha = 0.05$ ); this indicates that there is at least one statistically significant relationship ( $\alpha = 0.05$ ) between the components that the EFA sorted for the scale items.

**Table 3-17: The results of the KMO test and Bartlett test for sphericity and the values of the correlation coefficients for the components of the EFA of the PSM scale items in the third time**

Component	1	2
2	0.50*	
3	0.12*	0.47*

KMO and Bartlett's Test <sup>(1)</sup>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. $\chi^2$	df	Sig.
0.86	2874.30*	55	0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

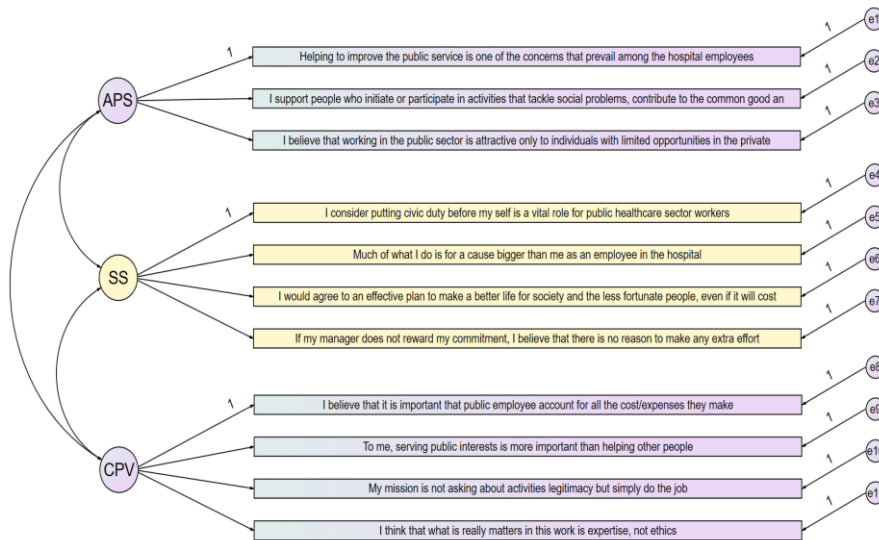
### 3.1.5.3 Confirmatory Factor Analysis

The confirmatory factor analysis (CFA) validity was verified by taking the following steps:

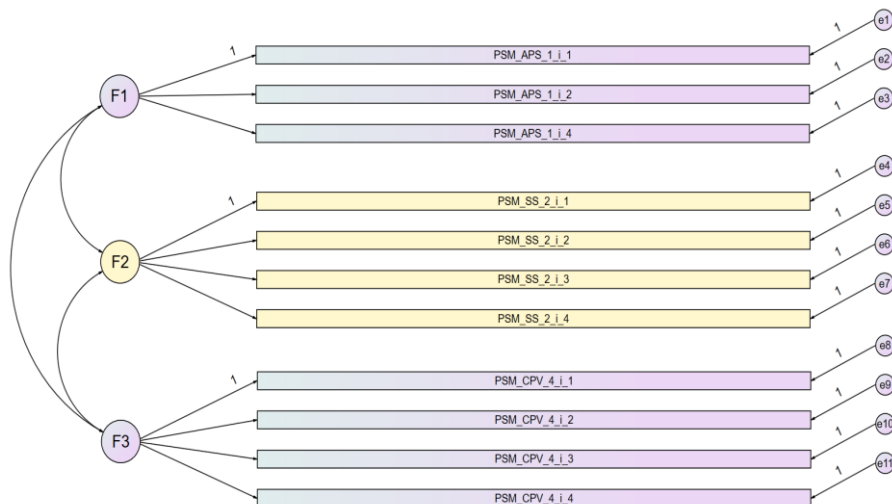
#### **CFA First Step: building a CFA model for the membership of PSM scale items to its dimensions.**

In light of the results of the third time for EFA analysis; the CFA model was built for testing the ability of PSM dimensions (i.e., APS, SS, and CPV) to predict its items. In order to be able to test its own null hypotheses which stated: *“There is no statistically significant predictive ability at the alpha level ( $\alpha = 0.05$ ) for PSM dimension (APS) with its paragraphs, and there is no statistically significant predictive ability ( $\alpha = 0.05$ ) for the dimension of PSM (SS) with its paragraphs, and there is no statistically significant predictive ability ( $\alpha = 0.05$ ) for PSM dimension (CPV) with its paragraphs”*, as shown in Figures 3-4 and 3-5.

**Figure 3-4: CFA model based on the results of the third EFA model of the ability of PSM dimensions to predict its items, including the texts of the items**



**Figure 3-5: CFA model based on the results of the third EFA model of the ability of PSM dimensions to predict its items, including the names of the items**



### CFA Second Step: Excluding Outliers

The *Mahalanobis* distance was calculated for all members of the study sample with (567) employees of Jordanian public hospitals cadres in Jordan while conducting the CFA of the ability of PSM dimensions (i.e., APS, SS, and CPV) to predict its paragraphs; to detect individuals who abuse the possibility of matching the with its content data sufficiently because they are far from its center, as shown in Table 3-18.

**Table 3-18: The results of the *Mahalanobis* distance test for the individuals who are far from a data center in the model of the PSM dimension's ability to predict its items**

SN	Case ID	Mahalanobis $d^2$	$p_1$	$p_2$
1	117	52.63*	0.000	0.000
2	433	34.42*	0.000	0.014
3	388	34.39*	0.000	0.001
4	360	33.74*	0.000	0.000
5	389	32.32*	0.001	0.000
6	173	31.40*	0.001	0.000
7	417	31.32*	0.001	0.000
8	403	29.78*	0.002	0.000
9	386	29.24*	0.002	0.000
10	200	28.68*	0.003	0.000
11	61	28.64*	0.003	0.000
12	180	28.42*	0.003	0.000
13	440	28.32*	0.003	0.000
14	494	28.28*	0.003	0.000
15	532	28.19*	0.003	0.000
16	81	28.16*	0.003	0.000
17	441	28.10*	0.003	0.000
18	383	28.04*	0.003	0.000
19	402	27.89*	0.003	0.000
20	51	27.40*	0.004	0.000
21	229	27.07*	0.004	0.000
22	567	26.61*	0.005	0.000
23	217	26.52*	0.005	0.000
24	434	26.44*	0.006	0.000
25	437	26.34*	0.006	0.000
26	442	26.24*	0.006	0.000
27	164	25.84*	0.007	0.000
28	521	25.73*	0.007	0.000
29	428	25.66*	0.007	0.000
30	404	25.53*	0.008	0.000
31	418	25.45*	0.008	0.000
32	439	25.25*	0.008	0.000

SN	Case ID	Mahalanobis d <sup>2</sup>	p1	p2
33	259	24.63*	0.010	0.000
34	136	24.42*	0.011	0.000
35	184	23.72*	0.014	0.000
36	374	23.26*	0.016	0.000
37	297	23.06*	0.017	0.000
38	414	23.04*	0.017	0.000
39	89	22.81*	0.019	0.000
40	347	22.69*	0.020	0.000
41	405	22.21*	0.023	0.000
42	400	22.14*	0.023	0.000
43	59	22.13*	0.023	0.000
44	502	22.11*	0.024	0.000
45	416	21.94*	0.025	0.000
46	245	21.92*	0.025	0.000
47	267	21.88*	0.025	0.000
48	134	21.65*	0.027	0.000
49	401	21.32*	0.030	0.000
50	504	21.26*	0.031	0.000
51	50	21.25*	0.031	0.000
52	324	21.20*	0.031	0.000
53	138	20.98*	0.034	0.000
54	344	20.78*	0.036	0.000
55	14	20.74*	0.036	0.000
56	101	20.72*	0.036	0.000
57	430	20.70*	0.037	0.000
58	425	20.58*	0.038	0.000
59	390	20.30*	0.041	0.000
60	155	20.23*	0.042	0.000
61	443	20.18*	0.043	0.000
62	154	19.78*	0.048	0.000
63	215	19.66*	0.050	0.000
64	166	19.66*	0.050	0.000

\*  $p \leq 0.05$ 

It is evident from Table 3-18 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the calculated *Mahalanobis* distance values for sixty-four employees of Jordanian hospital staff from a data center of the capacity PSM dimensions to predict its items model, which necessitated their dropping from the data of the model, in order to be able to re-run the CFA on the data of the remaining (503) employees.

### CFA Third Step: Multivariate normal distribution tests for PSM dimensions

The skewness and kurtosis indicators of the ability of the PSM dimensions model were calculated to predict its items. To reveal the violation of the assumption of a multivariate normal distribution of the responses of the study sample members to the items of the PSM dimensions Model towards public service, as shown in Table 3-19.

Table 3-19: the results of the skewness and kurtosis indices of PSM dimension's ability model to predict its items

Factor	Item ID	Assessment of Normality					
		Range of Means		Skewness		Kurtosis	
		Min.	Max.	Statistic	CR	Statistic	CR
APS	1	1	5	-0.017	-0.153	-0.673	-2.970*
	2	1	5	0.552	4.872*	-0.569	-2.508*
	4	1	5	0.593	5.233*	-0.314	-1.386
SS	1	1	5	0.014	0.122	-0.913	-4.029*
	2	1	5	0.129	1.135	-0.865	-3.814*
	3	1	5	0.222	1.957	-0.784	-3.460*
	4	1	5	0.036	0.319	-0.595	-2.624*
CPV	1	1	5	-0.346	-3.056*	-0.446	-1.968*
	2	1	5	-0.224	-1.973*	-0.567	-2.500*
	3	1	5	0.083	0.728	-0.647	-2.855*
	4	1	5	-0.023	-0.201	-0.640	-2.822*
<b>Mardia's (1970) coefficient of multivariate kurtosis</b>						2.747	1.755

\*  $p \leq 0.05$

It is clear from Table 3-19 that the absolute value of the skewness coefficient did not increase for any paragraph of PSM dimensions to predict its paragraphs from criterion (2), where its absolute values ranged between (0.014-0.593). It is clear that the absolute value of the kurtosis coefficient of any paragraph of the model variables did not exceed the standard value of (7), as its absolute values ranged between (0.314-0.913), which is within the rule of thumb (West, et al., 1995).

However, the researcher took one step beyond by applying (The bootstrap) method based on the Maximum Likelihood Estimator (MLE) using the parametric Monte Carlo method (Cheung & Lau, 2008) as a



precautionary measure, despite not violating the assumption of a multivariate normal distribution of the responses of the study sample to the model variables according to the [Mardia \(1970\)](#) standardized coefficient value for multivariate kurtosis, which was not statistically significant ( $\alpha = 0.05$ ), it reached (1.755), by taking the mean of the results of (200) random samples taken from the data of the 503 employees of hospital staff in Jordan; in order to ensure the stability and validity of CFA results later on, because this method is considered one of the indicators of accuracy that is used as an alternative to inferential statistics based on assumptions specific to the model when those assumptions are questionable and not fulfilled in this case.

**CFA Fourth Step: Processing the values of the extreme adjustment indicators between the pairs of measurement errors of the PSM dimensions**

The values of the assumed extreme adjustment indicators were monitored between pairs of measurement errors of PSM dimensions items (i.e., APS, SS, and CPV) that exceed criterion (4), and only the extreme adjustment indicators were treated the positive orientation in the amount of its parameter changes by creating a covariance coefficient (standardized correlation) between each pair of paragraph measurement errors for each dimension of the PSM scale. The predictions are made separately, as shown in Table 3-20.

It is noticed from Table 3-20 that one pair of item measurement errors pairs from PSM dimension (APS) in the predicted hospitals has been addressed in light of the value of its extreme modification index with a positive direction in the amount of change of its parameter that increases from criterion (4) by creating a coefficient's covariance (standardized correlation). Also, it is noted that two pairs of item measurement errors have been addressed conserving the PSM dimension (SS) in the predicted hospitals, more, the table (Table 3-20) shows the values of their two extreme adjustment indicators that have a positive direction in the amount of their parameter change that exceeds the standard (4) by creating two coefficient's covariance (two standardized correlations).

Table 3-20: The values of the assumed extreme adjustment indices for the unstandardized coefficient's covariance between each pair of item measurement errors for each dimension of the PSM scale separately, and the status of their treatment in the unfitted model

FACTOR	Covariance between operands of the pair		Model				Status	
			First Unfitted		Second Fitted			
			First	↔	Second	MI		Par Change
CPV	e11	↔	CPV	6.3	-0.06	7.5	-0.07	
	e11	↔	SS	8.1	0.08	8.8	0.07	
	e10	↔	e11	7.0*	0.07			<i>Treated within its Domain</i>
	e9	↔	e11	9.4	-0.07	4.5	-0.05	
SS	e7	↔	CPV	29.5	0.13	7.8	0.06	
	e7	↔	SS	12.8	-0.09			
	e7	↔	e11			4.2	0.05	
	e6	↔	CPV	7.7	0.07			
	e6	↔	SS	4.5	-0.05			
	e6	↔	e10	8.9	0.07	4.3	0.05	
	e6	↔	e7	70.7*	0.20			<i>Treated within its Domain</i>
	e5	↔	CPV	7.1	-0.05			
	e5	↔	e10	6.1	-0.05			
	e5	↔	e7	15.9	-0.08			
	e5	↔	e6	13.0	-0.07			
	APS	e4	↔	CPV	7.3	-0.05		
e4		↔	e11	4.6	0.05	5.0	0.05	
e4		↔	e7	25.5	-0.10			
e4		↔	e6	10.7	-0.07			
e4		↔	e5	42.4*	0.10			<i>Treated within its Domain</i>

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e3	↔	SS	5.6	-0.07	5.9	-0.06
e3	↔	e10	4.3	0.06	4.3	0.06
e2	↔	e7	4.2	-0.06	7.9	-0.07
e1	↔	CPV	9.2	-0.07	10.4	-0.08
e1	↔	e10			4.6	-0.05

\* *MI*: Should be treated if it is greater than criterion (4) and if its par. Change is positive

**CFA Fifth Step: Estimating the indicators of the CFA model of PSM dimension's ability to predict its items**

The values of fit indices [ $\chi^2$ ,  $\chi^2/df$ , SRMR, GFI, AGFI, NFI, IFI, TLI, CFI (RNI), RMSEA, Information Criteria (AIC, BCC, BIC, CAIC)] for the two models of the ability of PSM dimensions (i.e., APS, SS, and CPV) in hospitals to predict their items after and before treating the values of the assumed extreme adjustment indicators between each pair of item measurement errors of the PSM dimensions in the first (Unfitted) model, then the preference of the second model over the first model was calculated using the equation for the difference between the values of  $\chi^2$  for the two models, and the comparison between the values of their fit indices, as shown in Table 3-21.

Table 3-21: The result of the equation of the difference between the two values of  $\chi^2$  for the two models of the ability of PSM to predict its items after and before treating the values of the assumed extreme adjustment indicators between each pair of measurement errors of items dimensions PSM predicted in the first (Unfitted) model, and compare the values of the fit indices

Fit Indices			Comparison between values of		Which model fitting more?			
Description	Criterion	Second (Fitted) Models for treated PSM scale by PCA	First (Unfitted)					
Number of distinct sample moments		66	66					
Number of distinct parameters to be estimated		28	25		Second			
$C_{min}(\chi^2)$		92.56*	228.30*		135.74*			
Degrees of freedom (66-xx)		38	41		3			
Sig.		0.00	0.00		0.00			
$C_{min}(df)(\chi^2/df)$	<	5	2.44&	<	5.57	Second		
<i>RMR(SRMR)</i>	<	0.08	0.044	<	0.056	Second		
GFI	>	0.95	0.967	>	0.914	Second		
AGFI	>	0.90	0.942	>	0.861	Second		
<i>NFI</i>	$\delta_1$	>	0.95	>	0.971	>	0.928	Second
<i>IFI</i>	$\delta_2$	>	0.90	>	0.983	>	0.94	Second
<i>TLI</i>	$\rho_2$	>	0.95	>	0.975	>	0.919	Second
<i>CFI(RNI)</i>		>	0.90	>	0.982	>	0.94	Second
<i>RMSEA</i>		<	0.08	<	0.056	<	0.099*	Second
CI of 90%	Lower Limit 90%		0.041		0.087			
	Higher Limit 90%		0.07		0.112			
Sig. for Hypothesis of (P close)			0.248	>	0.00			Second
<i>AIC</i>	< the previous model		148.56	<	278.30			Second
<i>BCC</i>	< the previous model		150.04	<	279.63			Second
<i>BIC</i>	< the previous model		264.66	<	381.96			Second
<i>CAIC</i>	< the previous model		292.66	<	406.96			Second

& **Goodness-of-fit:** Within the threshold of Criterion (3)

# **Acceptable:** Within the threshold of Criterion (5)

\*  $p \leq 0.05$

It is noted from Table 3-21 that all fit indices of CFA to its criteria contained in the second (Fitted) model have been achieved after processing the extreme adjustment indicators that exceed criterion (4) in the first (Unfitted) model between each pair of pairs of measurement errors of paragraphs of the PSM dimensions (APS, SS, and CPV) predicted in the model of the ability of the PSM dimensions to predict its items compared to what it was in the first (Unfitted) model. Whereas the  $\chi^2/df$  ratio is perfectly matched for being less than the standard (3), the conformity index values (GFI, NFI, TLI) are greater than the



standard value(0.95), and the conformity index values (AGFI, IFI, CFI(RNI)) are greater than the criterion value (0.90), the values of the two fit indices (SRMR, REMSEA) became less than criterion (0.08), and all the values of the information criterion (AIC, BCC, BIC, CAIC) in the second (Unfitted) model became less than they were in the first (Unfitted) model.

In addition to the above, the difference between the values of  $\chi^2$  for the second (Fitted) and the first (Unfitted) models of (121.674) at the absolute value of the difference between the degrees of freedom of the second and first models (ABS (1-3)) was statistically significant ( $\alpha = 0.05$ ); to calculate the second (Fitted) model because it has a smaller  $\chi^2$  value of (3.432) than it is in the first (Unfitted) model because it has a larger  $\chi^2$  value (125.106).

**CFA Sixth Step: Estimation of the unstandardized and standardized regression coefficients of the ability of PSM dimensions to predict its items and the covariances coefficients discrepancies and standardized correlations between its dimensions and between each pair of pairs of measurement errors of dimensional items and the explanatory variances of dimensional items and the variances of dimensions predicting items**

The critical ratios of the values of the unstandardized regression coefficients estimated to their standard errors of the second (Fitted) model were calculated for the ability of the PSM dimensions (I.e., APS, SS, and CPV) to predict its items from, in addition to estimating its items, in addition, to estimate their standardized regression coefficients, as shown in Table 3-22.

**Table 3-22: Regression standardized and unstandardized coefficients of the PSM dimensions model to predict their items**

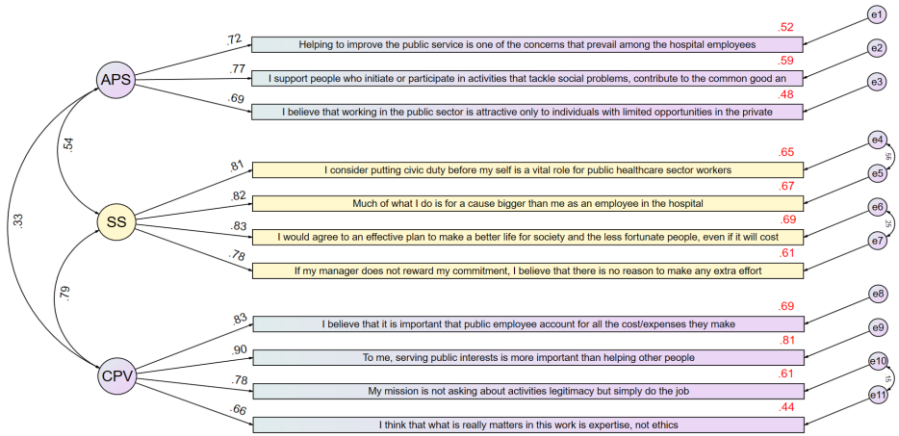
Paths for treated PSM scale by PCA		Estimates of:			CR	Sig.	R <sup>2</sup>	
		Unstandardized Regression Weights		Standardized Regression Weights				
Item ID	← Factor	B	se of B	$\beta$				
1	←	1		0.72			52.4%	
2	←	APS	1.20	0.09	0.77	12.73*	0.00	59.2%
4	←		1.02	0.08	0.69	12.21*	0.00	47.7%
1	←	1		0.81			64.9%	
2	←	SS	1.01	0.04	0.82	29.02*	0.00	67.1%
3	←		1.02	0.06	0.83	17.85*	0.00	68.6%
4	←		0.88	0.05	0.78	16.61*	0.00	60.9%
1	←	1		0.83			69.3%	
2	←	CPV	1.09	0.05	0.90	22.87*	0.00	80.6%
3	←		0.96	0.05	0.78	19.08*	0.00	60.9%
4	←		0.77	0.05	0.66	15.19*	0.00	43.6%

\*  $p < 0.05$

Note: The table shows the values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors of the second (Fitted) model of the ability of PSM dimensions to predict its items and the estimated standardized regression coefficients for them

It is clear from Table 3-22 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the estimated unstandardized regression coefficients for the ability of the PSM dimension [APS] of the Jordanian hospital staff in hospitals to predict its items and the reference values for its null hypotheses, which are (zero). The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors are greater than the Z value (+1.96) corresponding to the adopted significance level; which indicates rejecting of the null hypotheses that stated: “*There is no statistically significant predictive ability ( $\alpha = 0.05$ ) for the dimension of PSM (APS) in the Jordanian hospitals in its paragraphs*”; where it is clear APS in the Jordanian hospitals explains (47.7% to 59.2%) of the paragraphs attached to it, as shown in Figures 3-6 and 3-7.

**Figure 3-6: The values of the estimated standardized regression coefficients and the explained variance of the ability of PSM dimensions to predict its items from their point of view, the values of the estimated standardized correlation coefficients among the predictors, and the estimated standardized correlation coefficients between pairs of measurement errors for its predicted items**



**Figure 3-7: The values of the estimated unstandardized regression coefficients and the explained variance of the ability of PSM dimensions to predict its items from their point of view, the values of the estimated unstandardized correlation coefficients among the predictors, and the estimated unstandardized correlation coefficients between pairs of measurement errors for its predicted items**





Table 3-23 shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the estimated values of the coefficients of covariances the unstandardized predictors [PSM (APS, SS, and CPV)] and the reference values of (their null hypotheses) equal (zero), which ranged from (0.20-0.66) with standard errors ranging from (0.04-0.06), where the estimated values of the critical ratios of the coefficients of unstandardized covariances to their standard errors were greater than the Z value of (+1.96) that corresponds to the adopted significance level. It shows the values of the standard correlation coefficients for the predictors [PSM (APS, SS, and CPV)] that ranged between (0.33-0.80).

Also, the results show that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the unstandardized covariances coefficients arising from the treatment of the values of the extreme adjustment indicators for the pairs of measurement errors of two dimensions of [PSM (SS, and CPV)] estimated predicted and the reference values of its null hypotheses which is (zero), which ranged from (0.08-0.25) with standard errors ranging from (0.03-0.04), where the values of the critical ratios of the estimated unstandardized covariances coefficients to them to their standard errors were greater than the Z value (+1.96) corresponding to the adopted significance level.

It also shows the values of the standardized correlation coefficients arising from the treatment of the values of the extreme adjustment indicators for the pairs of measurement errors of the two dimensions PSM (i.e., SS, and CPV) estimated to range between (0.15-0.56).

**Table 3-23: The estimated values of the critical ratios of the unstandardized and standardized covariances coefficients for PSM to predict its items**

Relation between the operands of the pair			Estimates of:			CR	Sig.	
First	↔	Second	Unstandardized	Standardized				
			Covariance	se of Covariance	Correlation			
APS	↔	SS	0.34	0.04	0.54	7.75*	0.00	
APS	↔	CPV	0.20	0.04	0.33	5.45*	0.00	
SS	↔	CPV	0.66	0.06	0.80	10.79*	0.00	
SS	e <sub>6</sub>	↔	e <sub>7</sub>	0.11	0.03	0.26	3.22*	0.00
	e <sub>4</sub>	↔	e <sub>5</sub>	0.25	0.04	0.56	6.56*	0.00
CPV	e <sub>10</sub>	↔	e <sub>11</sub>	0.08	0.03	0.15	2.72*	0.01

\*  $p \leq 0.05$ 

Note: The table reveals the estimated values of the critical ratios of the unstandardized and standardized covariances coefficients to their standard errors, the values of the estimated standardized correlation coefficients for the predictors [PSM], and the values of the critical ratios of the coefficients of the unstandardized coefficients to their standard errors, and estimated values arising from the treatment coefficients outliers modifier predicted values for item measurement error pairs in two dimensions of public service motivation (SS, CPV),

Table 3-24 shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the estimated unstandardized covariance values for the predictors [PSM (APS, SS, and CPV)] and the reference values of their null hypotheses of (zero). It shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the estimated unstandardized covariance of measurement errors of its predicted dimensions and the reference values of its null hypothesis, which is (zero).

**Table 3-24: The values of the critical ratios of the estimated unstandardized covariance coefficients to their standard errors of the predictor’s dimensions of PSM, and of the measurement errors of its predicted items.**

Variances for Exogenous Variables	Estimates of:		CR	Sig.	
	Variance	se of Variance			
APS	0.47	0.06	7.88*	0.00	
SS	0.85	0.09	9.83*	0.00	
CPV	0.80	0.08	10.68*	0.00	
APS	e1	0.42	0.04	10.45*	0.00
	e2	0.46	0.05	8.99*	0.00
	e3	0.53	0.05	11.33*	0.00
SS	e4	0.46	0.04	10.48*	0.00
	e5	0.43	0.04	10.11*	0.00
	e6	0.40	0.04	9.54*	0.00
	e7	0.42	0.04	10.80*	0.00
CPV	e8	0.36	0.03	11.34*	0.00
	e9	0.23	0.03	8.23*	0.00
	e10	0.48	0.04	12.48*	0.00
	e11	0.62	0.05	13.79*	0.00

\*  $p \leq 0.05$

### 3.1.5.3 Verifying the composite reliability, convergent validity, and discriminant validity of PSM dimensions to predict its items.

In the light of the results of Table 3-22; composite reliability, and convergent validity of PSM dimensions, were estimated. More, considering the results of Table 3-23; the discriminant validity of the PSM dimensions was also estimated, as shown in Table 3-25.

**Table 3-25: The values of composite reliability, convergent, and discriminant validity values of PSM and its dimensions**

PSM & Dimensions	CR	AVE	SQRT(AVE)
APS	0.772	0.531	0.729
SS	0.883	0.654	0.808
CPV	0.874	0.636	0.798
PSM	0.946	0.614	
Criterion; Greater than:	0.700	0.490	Values of its Intraclass correlation with Other Dimensions

It is clear from Table 3-25 that the composite reliability value of the PSM scale is (0.946), and its values for the dimensions of the scale ranged between (0.772-0.883); where all the composite reliability values were greater than the standard (0.70). It is clear that the value of the convergent validity of the scale was (0.614), and its values for the dimensions of the PSM scale ranged between (0.531-0.654); where all values of convergent validity were greater than the standard (0.49).

Table 3-26 shows the extent to which the discriminant validity of PSM dimensions was achieved by comparing the square root values of convergent validity (SQRT(AVE)) with the values of the inter-correlation coefficients of the scale dimensions.

**Table 3-26: The values of the discriminant validity coefficients compared to the values of the intraclass correlation coefficients of PSM dimensions**

Intraclass Correlation	APS	SS	CPV
APS	<b>0.729</b>		
SS	0.542	<b>0.808</b>	
CPV	0.330	0.795	<b>0.798</b>

It is clear from Table 3-26 that all the discriminant validity values were greater than any correlation coefficient for PSM dimensions, which emphasizes verifying the discriminant validity between the dimensions of the PSM scale.

### 3.1.5.4 Internal consistency of PSM scale

Corrected Item-Total Correlation coefficients<sup>(3, 4)</sup> were calculated for the relationship of the PSM paragraphs and their dimensions; as indicators of the reliability of the internal consistency of scale building, items, and its dimensions, as shown in Table 3-27.

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<sup>3</sup> Statistically wise; the item-corrected correlation coefficient is more accurate than the Pearson correlation coefficient; where it takes into account the specificity of the paragraph from being of a categorical scale arranged in contrast to being continuous, and because it is calculated after deleting the response value on the scale/dimension paragraph concerned in PSM; which gives the pure correlation of the relationship of the paragraph with its scale/dimension among the staff of Jordan's public hospitals.

<sup>4</sup>  $R_i = (COV(X_i, P) - S_i^2) / (S_i \tilde{S}_i)$ ; citation (SPSS V26: (IBM SPSS STATISTICS ALGORITHMS.PDF); Page:922)

Table 3-27: Corrected correlation coefficient values for the relationship of PSM paragraphs and their dimensions

Domain & Item ID	Context of Item for PSM scale due to its Domain	Corrected Item-Total Correlation with:	
		Domain	Scale
<i>APS: Attraction to Public Service</i>			
	<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>		
1		0.64	0.40 <sup>*</sup>
	<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>		
2		0.60	0.47
	<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>		
4		0.54	0.38
<i>SS: Self-Sacrifice</i>			
	<i>I consider putting civic duty before my self is a vital role for public healthcare sector workers</i>		
1		0.74	0.70
	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>		
2		0.78	0.72
	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>		
3		0.70	0.69
	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>		
4		0.57	0.58
<i>CPI: Commitment to Public Values</i>			
	<i>I believe that it is important that public employee account for all the cost/expenses they make</i>		
1		0.68	0.57
	<i>To me, serving public interests is more important than helping other people</i>		
2		0.71	0.62
	<i>My mission is not asking about activities legitimacy but simply do the job</i>		
3		0.67	0.48
	<i>I think that what is really matters in this work is expertise, not ethics</i>		
4		0.56	0.50

<sup>\*</sup> p<0.05

It is noted from Table 3-27 that the values of the Corrected Item-Total Correlation for the relationship of APS paragraphs its dimension ranged between (0.54-0.64), and its scale ranged between (0.38-0.47), the values of the corrected correlation coefficients for SS with their dimension ranged between (0.57-0.78), and their scale ranged between (0.58-0.72), and the values of the corrected correlation coefficients for the CPV in their dimension ranged between (0.56-0.71), and their scale ranged between (0.48-0.62).

It is noted from the values related to the validity of the construction (consistency of homogeneity between the contents of the paragraphs of the scale, and consistency of homogeneity between the contents of the paragraphs of the dimensions of the scale separately); that the calculated values of the item discriminant coefficients (corrected correlation of the relation of items with the scale and its dimensions) did not fall below its critical value of (0.08215), which is calculated according to (t) test<sup>(5)</sup> which tests the null hypothesis which states that *“The calculated corrected correlation coefficient value does not differ from zero ( $\alpha = 0.05$ )”* at (565) degrees of freedom, which indicates the quality of constructing the paragraphs of the dimensions of a PSM scale.

Furthermore, the researcher calculated Pearson’s correlation coefficients for the relationship of the PSM scale with its dimensions, in addition to calculating the Pearson’s interrelationship coefficients for the dimensional relationship, as shown in Table 3-28.

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<sup>5</sup>  $t = (r \times \sqrt{df}) / \sqrt{1 - r^2}$ ; where:  $df = n - 2$ ;  $n$ : size of pilot study.

**Table 3-28: The values of the correlation coefficients of the PSM scale with its dimensions, and the values of the interrelationship's coefficients of its dimensions**

Correlation	APS	SS	CPV
SS	0.48*		
CPV	0.17*	0.57*	
PSM	0.64*	0.90*	0.78*

\*  $p \leq 0.05$

It is noticed from Table 3-28 that the values of Pearson's correlation coefficients ranged between (0.64-0.90) and that the values of the Pearson correlation coefficients for the relationship of the PSM scale dimensions ranged between (0.17-0.57); this indicates that the three dimensions constitute the features of the PSM. It is noted that the calculated Pearson correlation coefficients for the scale's relationship to their dimensions did not fall below its critical value of (0.08215), which is calculated according to the (t) test at (565) degrees of freedom, indicates the quality of the dimension's representation of the PSM sample members included in the study.

### 3.1.5.5 PSM Scale Reliability

For the purposes of calculating the consistency of the internal consistency of the PSM and its dimensions; *Cronbach's alpha* equation was used <sup>(6)</sup>, and *McDonald's Omega* was used; this is based on the fundamental (original) sample data, as shown in Table 3-29.

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6

$(k\bar{r})/[1 + (k - 1)\bar{r}]$ ; where  $k$  is the number of items,  $\bar{r}$  is the mean of correlation Coefficients among items of dimension.  $\rho_{standardized} =$



**Table 3-29: the values of internal consistency coefficients of the PSM scale and its dimensions**

PSM Scale & Domains	Reliability Statistics							N of Items
	Cronbach's $\alpha$ Based on Standardized Items					McDonald's $\Omega$		
	Value	Classification <sup>&amp;</sup>	Inter-Item Correlations			Value	Classification <sup>&amp;</sup>	
			Minimum	Mean <sup>+</sup>	Maximum			
APS	0.761	Reliable	0.46	0.51	0.59	0.763	Reliable	3
SS	0.851	Very Reliable	0.45	0.59	0.79	0.856	Very Reliable	4
CPV	0.828	Very Reliable	0.47	0.55	0.67	0.831	Very Reliable	4
Whole Scale	0.860	Very Reliable	-0.03	0.36	0.79	0.852	Very Reliable	11

Arithmetic means of the scale/dimension vertebrae correlation coefficient under the main diameter of its vertebrae correlation matrix

<sup>&</sup> The process of classifying the values of the internal consistency stability coefficients were carried out according to (Schermelleh-Engel, Moosbrugger, and Müller, 2003) standard

It is noticed from Table 3-29 that the internal consistency reliability of the scale reached its value (0.86), while the values of the internal consistency reliability coefficients of its dimensions ranged between (0.761-0.851) for them; which indicates the variation in the strength of the internal consistency coefficients according to Cronbach's alpha for the PSM scale and its dimensions for the difference in arithmetic means of the correlation coefficients between the scale/dimension paragraphs under the main diameter of the matrices of those coefficients between (Reliable to Very Reliable) according to (Schermelleh-Engel, Moosbrugger, and Müller, 2003), and due to the difference in the number of paragraphs of the scale/dimensions; this indicates, as a standard, that there is no violation of the homogeneity of the contents of items within the PSM scale and its dimensions separately, and a violation of the homogeneity of variance among the study sample respondents responding to the items and dimensions of the scale, and the reliability of the internal consistency of the scale was (0.852), while the values of the internal consistency coefficients of its dimensions

ranged between (0.763-0.856) for them; this indicates the variation in the strength of the internal consistency reliability coefficients according to *McDonald's Omega* for the scale and its dimensions due to the difference of these coefficients between (Reliable to Very Reliable) according to the previous standard.

### **3.1.6 Ethical Behavior Validity and reliability indicators**

#### **3.1.6.1 Face validity**

The face validity of ethical behavior in Jordanian public hospitals has been verified, as what was done in section 3.1.5.1 with PSM by presenting it to a group of arbitrators consisting of multiple Arbitrators with experience and expertise in the fields of public Administration, Law, Economics, Finance, Statistics, and Curriculum and methods, who hold academic ranks in academic institutions as it shows in Appendix 3.

#### **3.1.6.2 Ethical Behaviour Exploratory Factor Analysis**

The exploratory factor analysis (EFA) validity was verified by performing its steps three times as follows:

##### **First Step: Results of EFA for the first time according to the following rationing steps.**

To reveal the components (dimensions) included in the Jordan Hospital Staff Ethical Behaviour Scale; EFA was performed according to the (Promax Rotation Method with Kaiser Normalization), which is based on the Extraction Method of PCA, according to the Correlation Matrix, using the SPSS v28 program, as follows:

(1) Indicators based on reliability ([Hattie, 1985](#)): including ([Nunnally & Bernstein, 1994](#)) criterion to test the homogeneity of ethical behaviour items scale, with a value of (0.30); this is for the values of the corrected correlation coefficients for the 18 items of the ethical behavior scale according to Likert's method in grading with the total score of their scale, as shown in Table 3-30.

**Table 3-30: Values of the corrected correlation coefficients for ethical behavior items with their scale before EFA for the first time**

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
<b>EBS: Ethical Behavior of Self</b>		
1	It is acceptable for me to take office supplies home	0.55
2	In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards	0.58 <sup>†</sup>
3	I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization	0.54
4	I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work	0.56
5	I believe that it is acceptable to make personal calls at work	0.55
<b>EBC: Ethical Behavior of Co-workers</b>		
1	My co-workers feel that it is acceptable to take office supplies home	0.57
2	In order to get ahead in their future careers, my co-workers believe that one has to compromise personal ethical standards	0.60
3	My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization	0.47
4	My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work	0.50
5	My co-workers believe that it is acceptable to make personal calls at work	0.41 <sup>‡</sup>
<b>ELS: Ethical Leadership</b>		
1	My supervisor keeps his/her actions consistent with his/her stated values	0.44
2	My supervisor shows a strong concern for ethical and moral values	0.07 <sup>†</sup>
3	My supervisor sets an example of ethical behavior in his/her decisions and actions	0.02 <sup>†</sup>
4	My supervisor is honest and can be trusted to tell the truth	0.29 <sup>‡*</sup>
5	My supervisor holds employees accountable for using ethical practices in their work	0.47
6	My supervisor insists on doing what is fair and ethical even when it is not easy	0.45
7	My supervisor opposes the use of unethical practices to increase performance	0.33
8	My supervisor regards honesty and integrity as important personal values	0.34

\*  $p \leq 0.05$

<sup>†</sup> CITC: Less than criterion (0.30) & less than criterion (0.20)

<sup>‡</sup> CITC: Less than criterion (0.30) & greater than criterion (0.20)

It is clear from Table 3-30 that the values of the Corrected Item-Total Correlation for ethical behavior items scale with its scale ranged between (0.33-0.60) after excluding the two items (with two numbers: 2, 3) from the ELS dimension; because its corrected correlation coefficient with its scale is less than a standard (0.20), and after



excluding the item (no. 4) from the ethical leadership dimension; because its corrected correlation coefficient with its scale is less than (0.30).

(2) Indicators based on EFA ([Hattie, 1985](#)): including; the Communalities criterion, which considers the paragraph to be fully saturated in one dimension only when its value is greater than (0.59), as well as which considers the paragraph to be acceptable saturation in one dimension somewhat when its value is greater than (0.49) approved in the help guide in the package program SPSS V28 for each of [[Green, Lissitz & Mulaik \(1997\)](#), [Hattie & Hansford \(1982\)](#), [Watkins & Hattie \(1980\)](#)], as shown in Table 3-31.

**Table 3-31: Communalities values of the ethical behavior scale items during the EFA for the first time**

Dimension & Item ID	Context for items of EB Scale	Extracted Communalities
<b>EBS: Ethical Behavior of Self</b>		
1	<i>It is acceptable for me to take office supplies home</i>	060
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	066
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	064
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	064
5	<i>I believe that it is acceptable to make personal calls at work</i>	059
<b>EBC: Ethical Behavior of Co-workers</b>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	056
2	<i>In order to get ahead in their future careers, my co-workers believe that one has to compromise personal ethical standards</i>	053
3	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	070
4	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	074
5	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	059
<b>ELS: Ethical Leadership</b>		
1	<i>My supervisor keeps his/her actions consistent with his/her stated values</i>	046*
2	<i>My supervisor shows a strong concern for ethical and moral values</i>	068
3	<i>My supervisor sets an example of ethical behavior in his/her decisions and actions</i>	077
4	<i>My supervisor is honest and can be trusted to tell the truth</i>	050
5	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	052
6	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	057
7	<i>My supervisor opposes the use of unethical practices to increase performance</i>	057
8	<i>My supervisor regards honesty and integrity as important personal values</i>	062

\* *Godness-of-fit*: Communality greater than the criterion (0.59) or *Acceptable*: Communality greater than the criterion (0.49)

It is clear from Table 3-31 that the commonalities values of the extracted ethical behavior scale items ranged between (0.50-0.77) after excluding the item (number: 1) from the ethical leadership dimension because its extracted commonality value is less than the standard (0.50).

(3) Indicators based on EFA (Hattie, 1985): including; (Gorsuch, 1983) steps for EFA: it is not permissible to adopt the paragraph with saturation less than (0.40), or the false dimension (Trivial Factor) consisting of two paragraphs or less may not be adopted, or the paragraph may not be saturated on two dimensions with values greater than (0.40), or the non-membership of the paragraph to the sorted component due to the non-objectivity of its content consistency with the content of the rest of the sorted component paragraphs within it, as shown in Table 3-32.

It is clear from Table 3-33 that it is necessary to drop the paragraph (number: 2) after the EBC; because its saturation is less than the standard (0.40) according to Gorsuch's steps to standardize instruments using EFA.

**Table 3-33: Saturation values of ethical behavior items during the first EFA**

Dimension & Item ID	Context for items of EB Scale	Component				Reasoning of deletion
		EBS	ELS	EBC	Trivial ELS	
<b>EBS: Ethical Behavior of Self</b>						
2	In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards	0.82				
3	I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization	0.82				
4	I believe that it is okay to bypass established protocols in order to be more efficient or effective at work	0.82				
5	I believe that it is acceptable to make personal calls at work	0.70				
1	It is acceptable for me to take office supplies home	0.69				
1	My coworkers feel that it is acceptable to take office supplies home (Previously; belongs to EBC)	0.53				
<b>ELS: Ethical Leadership</b>						
8	My supervisor regards honesty and integrity as important personal values		0.80			
7	My supervisor opposes the use of unethical practices to increase performance		0.78			
5	My supervisor holds employees accountable for using ethical practices in their work		0.66			
6	My supervisor insists on doing what is fair and ethical even when it is not easy		0.57	0.45		
1	My supervisor keeps his/her actions consistent with his/her stated values	0.43	0.48			
<b>EBC: Ethical Behavior of Coworkers</b>						
3	My coworkers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization			0.80		
4	My coworkers believe that it is okay to bypass established protocols in order to be more efficient or effective at work			0.79		
5	My coworkers believe that it is acceptable to make personal calls at work			0.78		
2	In order to get ahead in their future careers, my coworkers believe that one has to compromise personal ethical standards			0.39		Loading less than criterion (0.40)
<b>Trivial ELS</b>						
3	My supervisor sets an example of ethical behavior in his/her decisions and actions				0.88	
2	My supervisor shows a strong concern for ethical and moral values				0.79	
4	My supervisor is honest and can be trusted to tell the truth				0.62	

Table 3-34 shows that EFA for the first time; extract four components that have a latent root greater than the reference value (1) to explain together the amount of (60.78%) of the total cumulative explanatory variance of the items of the ethical behavior scale, with an explanatory variable for the first component that exceeds (20%), where its value reached (29.99%).

**Table 3-34: Results of the EFA of the ethical behavior items for the first time**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	5.40	29.99	29.99	5.40	29.99	29.99
2	2.23	12.39	42.38	2.23	12.39	42.38
3	1.85	10.29	52.67	1.85	10.29	52.67
4	1.46	8.11	60.78	1.46	8.11	60.78
5	0.84	4.68	65.46			

Table 3-35 shows the values of the correlation coefficients between the components that the EFA first sorted for the ethical behavior items, followed by the KMO test result, which has a value of (0.84), which indicates the adequacy and appropriateness of the scale data for the EFA in the study sample, followed by a result Bartlett's test for sphericity, which has a value of (3977.63) in terms of statistical significance ( $\alpha = 0.05$ ); this indicates that there is at least one statistically significant relationship ( $\alpha = 0.05$ ) between the components that the exploratory factor analysis sorted the first time for the items of the scale.



**Table 3-36: Results of the KMO and Bartlett tests for sphericity and the values of the correlation coefficients for the components of the ethical behavior items EFA for the first time**

Component	1	2	3
2	0.31*		
3	0.40*	0.31*	
4	0.09*	-0.02	-0.08*

KMO and Bartlett's Test <sup>(1)</sup>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. $\chi^2$	df	Sig.
0.84	3977.63*	153	0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

**Second Step: The results of EFA for the second time according to the following rationing steps:**

To reveal the components (dimensions) included in the Jordan Hospital Staff Ethical Behavior Scale in hospitals; the EFA was performed according to the oblique rotation method based on the method of extracting the analysis of the basic components in light of the result of the EFA for the first time according to the correlation matrix using the SPSS v28 program as follows:

(1) Indicators based on stability: including (Nunnally and Bernstein, 1994) criterion for testing the homogeneity of the scale items, which has a value of (0.30), for the values of the corrected correlation coefficients for the items of the ethical behavior scale that they are 17 according to Likert's method of ranking with the total score of their scale, as shown in Table 3-37. It is clear from Table 3-37 that the values of the corrected correlation coefficients for the items of the ethical behavior scale with its scale ranged between (0.32-0.56) after excluding the two items (with two numbers: 2, 3) from the ELS dimension; because it's corrected correlation coefficient with its scale is less than a standard (0.20), and after excluding the item (no. 4) from the ELS dimension; because its corrected correlation coefficient with its scale is less than (0.30).

Table 3-37: the values of the corrected correlation coefficients for the ethical behavior items with their scale before the EFA for the second time

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
<b>EBS: Ethical Behavior of Self</b>		
1	<i>It is acceptable for me to take office supplies home</i>	0.55*
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.58*
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.54*
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.56*
5	<i>I believe that it is acceptable to make personal calls at work</i>	0.55*
<b>EBC: Ethical Behavior of Co-workers</b>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	0.55*
3	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.46*
4	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.49*
5	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	0.41*
<b>ELS: Ethical Leadership</b>		
1	<i>My supervisor keeps his/her actions consistent with his/her stated values</i>	0.43*
2	<i>My supervisor shows a strong concern for ethical and moral values</i>	0.09 <sup>+</sup>
3	<i>My supervisor sets an example of ethical behavior in his/her decisions and actions</i>	0.03 <sup>+</sup>
4	<i>My supervisor is honest and can be trusted to tell the truth</i>	0.28 <sup>&amp;</sup>
5	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	0.46*
6	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	0.42*
7	<i>My supervisor opposes the use of unethical practices to increase performance</i>	0.32*
8	<i>My supervisor regards honesty and integrity as important personal values</i>	0.32*

\*  $p < 0.05$ <sup>+</sup> CITC: Less than criterion (0.30) & less than criterion (0.20)<sup>&</sup> CITC: Less than criterion (0.30) & greater than criterion (0.20)

(2) Indicators based on EFA: including items communalities criterion that considers the paragraph to be completely saturated in one dimension only when its value is greater than (0.59), and also which considers the paragraph to be slightly saturated in one dimension when its value is greater than (0.49), as shown in Table 3-38.

**Table 3-38: Communalities values of the ethical behavior scale items during the EFA for the second time**

Dimension & Item ID	Context for items of EB Scale	Extracted Communalities
<b>EBS: Ethical Behavior of Self</b>		
1	It is acceptable for me to take office supplies home	0.60
2	In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards	0.66
3	I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization	0.64
4	I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work	0.64
5	I believe that it is acceptable to make personal calls at work	0.60
<b>EBC: Ethical Behavior of Co-workers</b>		
1	My co-workers feel that it is acceptable to take office supplies home	0.55
3	My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization	0.71
4	My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work	0.75
5	My co-workers believe that it is acceptable to make personal calls at work	0.59
<b>ELS: Ethical Leadership</b>		
1	My supervisor keeps his/her actions consistent with his/her stated values	0.46
2	My supervisor shows a strong concern for ethical and moral values	0.68
3	My supervisor sets an example of ethical behavior in his/her decisions and actions	0.77
4	My supervisor is honest and can be trusted to tell the truth	0.50
5	My supervisor holds employees accountable for using ethical practices in their work	0.52
6	My supervisor insists on doing what is fair and ethical even when it is not easy	0.59
7	My supervisor opposes the use of unethical practices to increase performance	0.58
8	My supervisor regards honesty and integrity as important personal values	0.63

(0.49) *Goodness-of-fit*: Communality greater than the criterion (0.59) or *Acceptable*: Communality greater than the criterion

It is clear from Table 3-38 that the extracted communalities values of the extracted ethical behavior scale items ranged between (0.50-0.77) after excluding the item (the number: 1) from the ELS dimension, for the reason that its extracted commonality value is less than the standard (0.50).

(3) Indicators based on EFA analysis: including [Gorsuch's \(1983\)](#) steps for EFA, as shown in Table 3-39.

**Table 3-39: The saturation values of the ethical behavior items during the EFA for the second time**

Dimens in & Item ID	Context for items of EB Scale	Component				Tri vial EL S	Reasoning of deletion
		E	E	L	B		
<b>EBS: Ethical Behavior of Self</b>							
	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.					
2		82					
	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.					
4		81					
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.					
3		81					
	<i>I believe that it is acceptable to make personal calls at work</i>	0.					
5		71					
	<i>It is acceptable for me to take office supplies home</i>	0.					
1		69					
	<i>My co-workers feel that it is acceptable to take office supplies home (Previously; belongs to EBC)</i>	0.					
1		55					
<b>ELS: Ethical Leadership</b>							
	<i>My supervisor regards honesty and integrity as important personal values</i>	0.					
8		79					
	<i>My supervisor opposes the use of unethical practices to increase performance</i>	0.					
7		78					
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	0.					
5		65					

Dimens in & Item ID	Context for items of EB Scale	Component			Tri vial EL S	Reasoning of dektion
		E	E	E		
6			0.59	0.04		
1		0.44	0.47			<i>Do not fit well with the factor solution* &amp; loadings greater than criterion (0.40) within narrow range in two components</i>
<b>EBC: Ethical Behavior of Co-workers</b>						
3				0.07		<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>
4				0.07		<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>
5				0.07		<i>My co-workers believe that it is acceptable to make personal calls at work</i>
<i>Continued...</i>						
<b>Tivial ELS</b>						
3				0.08		<i>My supervisor sets an example of ethical behavior in his/her decisions and actions (Previously; belongs to ELS)</i>
2				0.07		<i>My supervisor shows a strong concern for ethical and moral values (Previously; belongs to ELS)</i>
4				0.06		<i>My supervisor is honest and can be trusted to tell the truth (Previously; belongs to ELS)</i>

\* *Goodness-of-fit*: Communalities greater than the criterion (0.59) or *Acceptable*: Communalities greater than the criterion (0.40)

It is clear from Table 3-39 that it is necessary to drop the paragraph (with the number: 1) from the ELS dimension, which is classified within the ELS component; because it saturates two components with a saturation greater than the standard (0.40), and because its commonality value is not acceptable if it is less than (0.50); which means that it does not match the one-dimensionality well, according to its result in Table 3-39.

Table 3-40 shows that the EFA in the second time; excludes four components that have a latent root greater than the reference value (1), together explaining the amount of (61.57%) of the total cumulative explained variance of the items of the ethical behavior scale, with an explained variance for the first component that exceeds (20%) where its value is (29.15%).

**Table 3-40: Results of the EFA of the ethical behavior items for the second time**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	4.96	29.15	29.15	4.96	29.15	29.15
2	2.21	13.00	42.16	2.21	13.00	42.16
3	1.85	10.87	53.03	1.85	10.87	53.03
4	1.45	8.54	61.57	1.45	8.54	61.57
5	0.83	4.85	66.43			

Table 3-41 illustrate the values of the correlation coefficients between the components of the sorted EFA for the second time of ethical behavior items, followed by the KMO test result, which has a value of (0.87), which indicates the appropriateness of the scale data for EFA, followed by the Bartlett test result for sphericity that Its value is (3639.23) with statistical significance ( $\alpha = 0.05$ ); which indicates the factorability of this scale.

**Table 3-41: The results of the KMO test and Bartlett test for sphericity and the values of the correlation coefficients for the components of the EFA of the ethical behavior items for the second time**

Component	1	2	3
2	0.27*		
3	0.36*	0.24*	
4	0.09*	-0.02	-0.09*

KMO and Bartlett's Test <sup>(1)</sup>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. $\chi^2$	df	Sig.
0.87	3639.23*	136	0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

**Third Step: The results of EFA for the third time according to the following rationing steps.**

(1) In this step, the researcher had adopted the same steps as in the first and second steps of EFA scale rationing, which is calculating the values based on the reliability indicators; via the values of the corrected correlation coefficients for the 18 items of the ethical behavior scale according to Likert method in grading with the total score of their scale, as shown in Table 3-42.

**Table 3-42: The values of the corrected correlation coefficients for the ethical behavior items with their scale before the EFA for the third time**

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
<i>EBS: Ethical Behavior of Self</i>		
1	<i>It is acceptable for me to take office supplies home</i>	0.56*
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.57*
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.53*
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.55*
5	<i>I believe that it is acceptable to make personal calls at work</i>	0.55*
<i>EBC: Ethical Behavior of Co-workers</i>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	0.55*

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization		
3		0.47*
My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work		
4		0.50*
My co-workers believe that it is acceptable to make personal calls at work		
5		0.42*
<b>ELS: Ethical Leadership</b>		
My supervisor shows a strong concern for ethical and moral values		
2		0.08 <sup>+</sup>
My supervisor sets an example of ethical behavior in his/her decisions and actions		
3		0.04 <sup>+</sup>
My supervisor is honest and can be trusted to tell the truth		
4		0.28 <sup>&amp;</sup>
My supervisor holds employees accountable for using ethical practices in their work		
5		0.45*
My supervisor insists on doing what is fair and ethical even when it is not easy		
6		0.42*
My supervisor opposes the use of unethical practices to increase performance		
7		0.30*
My supervisor regards honesty and integrity as important personal values		
8		0.30*

\*  $p < 0.05$ <sup>+</sup> CITC: Less than criterion (0.30) & less than criterion (0.20)<sup>&</sup> CITC: Less than criterion (0.30) & greater than criterion (0.20)

It is clear from Table 3-42 that the values of the Corrected Item-Total Correlation for the items of the ethical behavior scale ranged between (0.30-0.57), after excluding the two items (with two numbers: 2, 3) from the ELS dimension; because its corrected correlation coefficient with its scale is less than a standard (0.20), after excluding the item (no. 4) from the ELS dimension; because its corrected correlation coefficient with its scale is less than (0.30).

(2) Indicators based on EFA: including items communalities criterion as shown in Table 3-43.



**Table 3-43: Communalities values of the ethical behavior scale items during the EFA for the third time**

<b>Dimension</b>	<b>Context for items</b>	<b>Extracted</b>
<b>FRS: Ethical Behavior of Self</b>		
	<i>It is acceptable for me to take office supplies home</i>	
1		0.61
	<i>In order to get ahead in my future career I believe that one has sometimes to compromise personal ethical standards</i>	
2		0.67
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their</i>	
3		0.66
	<i>I believe that it is okay to bypass established protocols in order to be more efficient or effective at work</i>	
4		0.65
	<i>I believe that it is acceptable to make personal calls at work</i>	
5		0.60
<b>EBC: Ethical Behavior of Co-workers</b>		
	<i>My co-workers feel that it is acceptable to take office supplies home</i>	
1		0.55
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their</i>	
3		0.71
	<i>My co-workers believe that it is okay to bypass established protocols in order to be more efficient or effective at work</i>	
4		0.75
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	
5		0.62
<b>ELS: Ethical Leadership</b>		
	<i>My supervisor shows a strong concern for ethical and moral values</i>	
2		0.68
	<i>My supervisor sets an example of ethical behavior in his/her decisions and actions</i>	
3		0.77
	<i>My supervisor is honest and can be trusted to tell the truth</i>	
4		0.51
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	
5		0.54
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	
6		0.60
	<i>My supervisor opposes the use of unethical practices to increase performance</i>	
7		0.59
	<i>My supervisor regards honesty and integrity as important personal values</i>	
8		0.61

It is clear from Table 3-43 that the communalities extracted values of the ethical behavior scale items ranged between (0.51 -and 0.77); including that each of the 16 paragraphs is saturated within one component at most.

(3) Indicators based on exploratory factor analysis: including Gorsuch's (1983) steps for EFA, as shown in Table 3-44.

Table 3-44: Values of ethical behavior items saturation during the third EFA for the third time

Dimension & Item ID	Context for items of EB Scale	Component				Reasoning of deletion
		EBS	ELS	EBC	Trivial ELS	
<b>EBS: Ethical Behavior of Self</b>						
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>					
3		0.84				
	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>					
2		0.83				
	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>					
4		0.83				
	<i>I believe that it is acceptable to make personal calls at work</i>					
5		0.70				
	<i>It is acceptable for me to take office supplies home</i>					
1		0.70				
	<i>My co-workers feel that it is acceptable to take office supplies home (Previously; belongs to EBC)</i>					
1		0.52				
<b>ELS: Ethical Leadership</b>						
	<i>My supervisor opposes the use of unethical practices to increase performance</i>					
7			0.78			
	<i>My supervisor regards honesty and integrity as important personal values</i>					
8			0.78			
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>					
5			0.67			
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>					
6			0.62			
<b>EBC: Ethical Behavior of Co-workers</b>						
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>					
5				0.80		
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>					
3				0.80		
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>					
4				0.78		
<b>Trivial ELS</b>						
	<i>My supervisor sets an example of ethical behavior in his/her decisions and actions (Previously; belongs to ELS)</i>					
3				0.88		CITC; less than criteria [(0.30) & (0.20)]
	<i>My supervisor shows a strong concern for ethical and moral values (Previously; belongs to ELS)</i>					
2				0.79		CITC; less than criteria [(0.30) & (0.20)]
	<i>My supervisor is honest and can be trusted to tell the truth (Previously; belongs to ELS)</i>					
4				0.63		



It is clear from Table 3-44 that it is necessary to drop the two paragraphs (with two numbers: 3 and 4) from the dimension of ELS; because they constitute a pseudo-dimension according to *Gorsuch's* steps to standardize tools using EFA, and because their corrected correlation coefficient values are less than the standard (0.20) according to their result in Table 3-42.

Table 3-45 shows that the EFA in the third time; extracted four components that have a latent root greater than the reference value (1) explaining together the amount of (63.29%) of the total cumulative explanatory variance of the items of the ethical behavior scale, with an explanatory variable for the first component that exceeds (20%) with a value of (29.68%).

**Table 3-45: The results of the KMO test and Bartlett test for sphericity and the values of the correlation coefficients for the components of the EFA of the ethical behavior items for the third time**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	4.75	29.68	29.68	4.75	29.68	29.68
2	2.21	13.80	43.48	2.21	13.80	43.48
3	1.78	11.12	54.61	1.78	11.12	54.61
4	1.39	8.68	63.29	1.39	8.68	63.29
5	0.79	4.95	68.24			

Table 3-46 shows the values of correlation coefficients between the components of EFA for the third time sorted for the ethical behavior items, followed by the KMO test result, which has a value of (0.87), which indicates the appropriateness of the scale data for EFA, followed by the Bartlett test result for sphericity that Its value is (3442.41) with statistical significance ( $\alpha = 0.05$ ). this indicates that there is at least one statistically significant relationship ( $\alpha = 0.05$ ).

**Table 3-46: the results of the EFA of the ethical behavior items for the third time**

Component	1	2	3
2	0.24*		
3	0.40*	0.28*	
4	0.07	-0.05	-0.08*

KMO and Bartlett's Test <sup>(1)</sup>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. $\chi^2$	df	Sig.
0.87	3442.41*	120	0.00

<sup>(1)</sup> Based on correlations  
 \*  $p \leq 0.05$

**Fourth Step: The results of EFA for the fourth time according to the following rationing steps.**

(1) Within this step, the researcher had followed the same steps as in the first, second, and third steps of EFA scale rationing, which is calculating the values based on the reliability indicators; via the values of the corrected correlation coefficients for the 14 items of the ethical behavior scale according to Likert method in grading with the total score of their scale, as shown in Table 3-47.

**Table 3-47: The values of the corrected correlation coefficients for the ethical behavior items with their scale before the EFA for the fourth time**

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
<i>EBS: Ethical Behavior of Self</i>		
1	<i>It is acceptable for me to take office supplies home</i>	056 <sup>*</sup>
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	057 <sup>*</sup>
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	054 <sup>*</sup>
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	056 <sup>*</sup>
5	<i>I believe that it is acceptable to make personal calls at work</i>	056 <sup>*</sup>
<i>EBC: Ethical Behavior of Co-workers</i>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	057 <sup>*</sup>
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	



Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
3		053 <sup>*</sup>
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	
4		057 <sup>*</sup>
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	
5		040 <sup>*</sup>
<b>ELS: Ethical Leadership</b>		
	<i>My supervisor is honest and can be trusted to tell the truth</i>	
4		019 <sup>+</sup>
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	
5		047 <sup>*</sup>
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	
6		044 <sup>*</sup>
	<i>My supervisor opposes the use of unethical practices to increase performance</i>	
7		034 <sup>*</sup>
	<i>My supervisor regards honesty and integrity as important personal values</i>	
8		035 <sup>*</sup>

<sup>\*</sup>  $p \leq 0.05$

<sup>+</sup> CITC: Less than criterion (0.30) & less than criterion (0.20)

It is clear from Table 3-47 that the values of the corrected correlation coefficients for the items of the ethical behavior scale with ranged between (0.34-0.57), after excluding the item (with the number: 4) from the ELS dimension, because its corrected correlation coefficient with its scale is less than a standard (0.20).

(2) Indicators based on exploratory factor analysis: including items communalities criterion that considers the items to be completely saturated in one dimension only when its value is greater than (0.59), and also which considers the item to be somewhat saturated in one dimension when its value is greater than (0.49), as shown in Table 3-48.

**Table 3-48: Communalities values of the ethical behavior scale items during the EFA for the fourth time**

Dimension & Item ID	Context for items of EB Scale	Extracted Communalities
<b>EBS: Ethical Behavior of Self</b>		
1	<i>It is acceptable for me to take office supplies home</i>	0.61
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.67
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.65
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.63
5	<i>I believe that it is acceptable to make personal calls at work</i>	0.59
<b>EBC: Ethical Behavior of Co-workers</b>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	0.55
3	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.72
4	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.76
5	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	0.48*
<b>ELS: Ethical Leadership</b>		
4	<i>My supervisor is honest and can be trusted to tell the truth</i>	0.25*
5	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	0.54
6	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	0.58
7	<i>My supervisor opposes the use of unethical practices to increase performance</i>	0.59
8	<i>My supervisor regards honesty and integrity as important personal values</i>	0.58

\* *Goodness-of-fit*: Communality greater than the criterion (0.59) or *Acceptable*: Communality greater than the criterion (0.49)

It is clear from Table 3-48 that the extracted communalities values of the ethical behavior scale items ranged between (0.54-0.76); after excluding paragraph (No. 5) from the dimension of EBC; because the value of its abstract commonality is less than the criterion (0.50), and after excluding the paragraph (with the number: 4) of ELS, because its extracted commonality value is less than the standard (0.50).



(3) Indicators based on exploratory factor analysis: including Gorsuch's (1983) steps for EFA, as shown in Table 3-49.

**Table 3-49: The saturated values of ethical behavior items during the EFA for the fourth time**

Dimens in	Context for items	Component			Reasoning of deletion
		E	E	E	
<b>EBS: Ethical Behavior of Self</b>					
2	In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards	0			
3	I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within	0			
4	I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work	0			
1	It is acceptable for me to take office supplies home	0			
5	I believe that it is acceptable to make personal calls at work	0			
1	My co-workers feel that it is acceptable to take office supplies home (Previously; belongs to EBC)	0			
<b>EBC: Ethical Behavior of Co-workers</b>					
4	My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at		08		
3	My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not		08		
5	My co-workers believe that it is acceptable to make personal calls at work		06		
<b>ELS: Ethical Leadership</b>					
7	My supervisor opposes the use of unethical practices to increase performance		0		
8	My supervisor regards honesty and integrity as important personal values		0		
5	My supervisor holds employees accountable for using ethical practices in their work		0		
6	My supervisor insists on doing what is fair and ethical even when it is not easy		0		
4	My supervisor is honest and can be trusted to tell the truth		0	Do not fit well with the factor solution* & loading less than criterion (0.40)	

\* *Goodness-of-fit*: Communality greater than the criterion (0.59) or *Acceptable*: Communality greater than the criterion (0.49)



It is clear from Table 3-49 that it is necessary to drop the paragraph (no. 4) from the ELS dimension; since it is saturated with less than the standard (0.40), according to *Gorsuch's* steps to standardize tools using EFA, and because the value of its corrected correlation coefficient is less than the standard (0.20) according to its result in Table 3-47, and because its communalities value is not acceptable if it was less than (0.50); which means that it does not match the one-dimensionality well according to its result in Table 3-48.

Table 3-50 shows that the EFA in the fourth time; extracted three components that have a latent root greater than the reference value (1) explaining together the amount of (58.57%) of the total cumulative explanatory variance of ethical behavior scale items, with an explanatory variance for the first component that exceeds (20%), where its value reached (33.88%).

**Table 3-50: Results of the EFA of the ethical behavior items for the fourth time**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	4.74	33.88	33.88	4.74	33.88	33.88
2	1.95	13.94	47.81	1.95	13.94	47.81
3	1.51	10.76	58.57	1.51	10.76	58.57
4	0.97	6.91	65.49			

Table 3-50 shows the values of the correlation coefficients between the components of EFA in the fourth time sorted for the ethical behavior items, followed by the KMO test result, which has a value of (0.88), which indicates the appropriateness of the scale data for EFA, followed by the Bartlett test result for sphericity (3002.43) with statistical significance ( $\alpha = 0.05$ ); which indicates the suitability to do factorial analysis.

**Table 3-50: The results of the EFA of the ethical behavior paragraphs for the fourth time**

Component	1	2
2	0.37*	
3	0.24*	0.27*
KMO and Bartlett's Test <sup>(1)</sup>		
Kaiser-Meyer-Olkin	Bartlett's Test of Sphericity	
Measure of Sampling Adequacy	Approx. $\chi^2$	df Sig.
0.88	3002.43*	91 0.00

<sup>(1)</sup> Based on correlations\*  $p \leq 0.05$ 

### **Fifth Step: The results of EFA for the fifth time according to the following rationing steps.**

(1) Within this step, the researcher had followed the same steps as in the first, second, third, and fourth steps of EFA scale rationing, which is calculating the values based on the reliability indicators; via the values of the corrected correlation coefficients for the 13 items of the ethical behavior scale according to Likert method in grading with the total score of their scale, as shown in Table 3-51.

**Table 3-51: The values of the corrected correlation coefficients for the ethical behavior items with their scale before the EFA for the fifth time**

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
<i>EBS: Ethical Behavior of Self</i>		
1	<i>It is acceptable for me to take office supplies home</i>	0.57*
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.57*
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.53*
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.56*
5	<i>I believe that it is acceptable to make personal calls at work</i>	0.57*
<i>EBC: Ethical Behavior of Co-workers</i>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	0.58*
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
3		0.55 <sup>*</sup>
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	
4		0.59 <sup>*</sup>
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	
5		0.41 <sup>*</sup>
<b>ELS: Ethical Leadership</b>		
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	
5		0.45 <sup>*</sup>
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	
6		0.45 <sup>*</sup>
	<i>My supervisor opposes the use of unethical practices to increase performance</i>	
7		0.34 <sup>*</sup>
	<i>My supervisor regards honesty and integrity as important personal values</i>	
8		0.35 <sup>*</sup>

\*  $p \leq 0.05$

It is discernible from Table 3-51 that the values of the corrected correlation coefficients for ethical behavior scale items ranged between (0.34 to 0.59).

(2) Indicators based on EFA: including Paragraph popularity criterion that considers the paragraph to be completely saturated in one dimension only when its value is greater than (0.59), and also which considers the paragraph to be somewhat saturated in one dimension when its value is greater than (0.49), as shown in Table 3-52.

Table 3-53 that the prevalence values of the extracted ethical behavior scale items ranged between (0.51-0.75); including that each paragraph out of thirteen paragraphs is saturated within one component at most.

**Table 3-53: the values of ethical behavior items communalities during the EFA for the fifth time**

Dimension & Item ID	Context for items of EB Scale	Extracted Communalities
<b>EBS: Ethical Behavior of Self</b>		
1	<i>It is acceptable for me to take office supplies home</i>	0.61
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.67
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.67
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.65
5	<i>I believe that it is acceptable to make personal calls at work</i>	0.59
<b>EBC: Ethical Behavior of Co-workers</b>		
1	<i>My co-workers feel that it is acceptable to take office supplies home</i>	0.55
3	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.72
4	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.75
5	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	0.53
<b>ELS: Ethical Leadership</b>		
5	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	0.51
6	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	0.59
7	<i>My supervisor opposes the use of unethical practices to increase performance</i>	0.62
8	<i>My supervisor regards honesty and integrity as important personal values</i>	0.62

(3) Indicators based on EFA: including [Gorsuch's \(1983\)](#) steps for EFA: It is not permissible to adopt a paragraph with saturation lower than (0.40), and this will be illustrated, in the next table (Table 3-54).

**Table 3-54: ethical behavior items Saturated values during the EFA for the fifth time**

Dimensi on	Context for items	Component			Reasoning of deletion
		EB	EB	EL	
<b>EBS: Ethical Behavior of Self</b>					
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within</i>				
3		08			
	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical</i>				
2		08			
	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>				
4		08			
	<i>It is acceptable for me to take office supplies home</i>				
1		07			
	<i>I believe that it is acceptable to make personal calls at work</i>				
5		06			
	<i>My co-workers feel that it is acceptable to take office supplies home (Previously; belongs to EBC)</i>				
1		05	04		<i>Loadings greater than criterion (040) within two components</i>
<b>EBC: Ethical Behavior of Co-workers</b>					
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not</i>				
3		08			
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at</i>				
4		08			
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>				
5		07			
<b>ELS: Ethical Leadership</b>					
	<i>My supervisor opposes the use of unethical practices to increase performance</i>				
7			08		
	<i>My supervisor regards honesty and integrity as important personal values</i>				
8			08		
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>				
5			06		
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>				
6			06		

It is clear from Table 3-54 the necessity to drop the paragraph (with the number: 1) from the EBC dimension, which is sorted within the employee's ethical behavior component; because its content is not consistent with the contents of the rest of the paragraphs sorted within the component of ethical employee behavior, and because it is saturated on two dimensions with saturation value greater than the standard (0.40) according to Gorsuch's steps to standardize tools using EFA.

Table 3-55 shows that the EFA in the fifth time; excluded three components that have a latent root greater than the reference value (1) explaining together the amount of (62.14%) of the total cumulative explanatory variance of ethical behaviour scale items, with an explanatory variance for the first component that exceeds (20%), where its value reached (36.16%).

**Table 3-56: the results of the KMO test and the Bartlett test for sphericity and the values of the correlation coefficients for the components of the EFA of ethical behavior items for the fifth time**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	4.70	36.16	36.16	4.70	36.16	36.16
2	1.94	14.96	51.12	1.94	14.96	51.12
3	1.43	11.02	62.14	1.43	11.02	62.14
4	0.82	6.28	68.42			

Table 3-57 shows the values of correlation coefficients between the components of the EFA sorted in the fifth time for the ethical behavior items, followed by the KMO test result, which has a value of (0.88), which indicates the appropriateness of the scale data for EFA, and followed by the Bartlett test result for sphericity that with a value of (2939.88) with statistical significance ( $\alpha = 0.05$ ).

**Table 3-57: the results of the EFA of ethical behavior items for the fifth time**

Component	1	2
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	2	0.41*	
	3	0.22*	0.29*
<b>KMO and Bartlett's Test<sup>(1)</sup></b>			
	<b>Kaiser-Meyer-Olkin</b>	<b>Bartlett's Test of Sphericity</b>	
<b>Measure of Sampling Adequacy</b>		<b>Approx. <math>\chi^2</math></b>	<b>df</b>
0.88		2939.88*	78
			<b>Sig.</b>
			0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

**Sixth Step: The results of EFA for the sixth time according to the following rationing steps.**

(1) In this step, the researcher had followed the same steps as in the first, second, third, fourth, and fifth steps of EFA scale rationing, which is calculating the values based on the reliability indicators; via the values of the corrected correlation coefficients for the 12 items of the ethical behavior scale according to Likert method in grading with the total score of their scale, as shown in Table 3-58.

**Table 3-58: The values of the corrected correlation coefficients for the ethical behavior items with their scale before the EFA for the sixth time**

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
<i><b>EBS: Ethical Behavior of Self</b></i>		
	<i>It is acceptable for me to take office supplies home</i>	
1		0.55*
	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	
2		0.56*
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	
3		0.53*
	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	
4		0.55*
	<i>I believe that it is acceptable to make personal calls at work</i>	
5		0.52*
<i><b>EBC: Ethical Behavior of Co-workers</b></i>		
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	
3		0.54*
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	
4		0.58*
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	
5		0.40*
<i><b>ELS: Ethical Leadership</b></i>		
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	



Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation
5		045*
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	
6		047*
	<i>My supervisor opposes the use of unethical practices to increase performance</i>	
7		035*
	<i>My supervisor regards honesty and integrity as important personal values</i>	
8		036*

\*  $p \leq 0.05$

It is clear from Table 3-58 that the values of the corrected correlation coefficients for ethical behavior scale items ranged between (0.35-0.58).

(2) Extracted Communalities values, as is illustrated in Table 3-59.

**Table 3-59: Communalities values of the ethical behavior scale items during the EFA for the sixth time**

Dimension & Item ID	Context for items of EB Scale	Extracted Communalities
<b>EBS: Ethical Behavior of Self</b>		
	<i>It is acceptable for me to take office supplies home</i>	
1		064
	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	
2		070
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	
3		068
	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	
4		066
	<i>I believe that it is acceptable to make personal calls at work</i>	
5		054
<b>EBC: Ethical Behavior of Co-workers</b>		
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	
3		073
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	
4		075
	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	
5		056
<b>ELS: Ethical Leadership</b>		
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	
5		051
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	
6		059



<i>My supervisor opposes the use of unethical practices to increase performance</i>	7	0.63
<i>My supervisor regards honesty and integrity as important personal values</i>	8	0.62

It is clear from Table 3-59 that the prevalence values of the extracted ethical behavior scale items ranged between (0.51-0.75); including that each paragraph out of twelve is saturated within one component at most.

(3) Indicators based on EFA: including **Gorsuch’s (1983)** steps for EFA, as shown in Table 3-60.

**Table 3-60: ethical behavior items saturated values during the EFA for the sixth time**

Dimension & Item ID	Context for items of EB Scale	Component		
		EBS	ELS	EBC
<b><i>EBS: Ethical Behavior of Self</i></b>				
	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>			
	3	0.84		
	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>			
	2	0.84		
	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>			
	4	0.81		
	<i>It is acceptable for me to take office supplies home</i>			
	1	0.72		
	<i>I believe that it is acceptable to make personal calls at work</i>			
	5	0.67		
<b><i>ELS: Ethical Leadership</i></b>				
	<i>My supervisor opposes the use of unethical practices to increase performance</i>			
	7		0.82	
	<i>My supervisor regards honesty and integrity as important personal values</i>			
	8		0.81	
	<i>My supervisor holds employees accountable for using ethical practices in their work</i>			
	5		0.66	
	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>			
	6		0.61	
<b><i>EBC: Ethical Behavior of Co-workers</i></b>				
	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>			
	3			0.84
	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>			



4	0.82
<i>My co-workers believe that it is acceptable to make personal calls at work</i>	
5	0.77

It is clear from Table 3-60 that all items of ethical behavior are saturated with values greater than (0.40) within the component (dimension) of each of them. Hence, the measure of the ethical behavior of Jordan's hospital staff in hospitals became in its final form in light of the indications of factorial validity, consisting of 12 items. It is divided into three dimensions; they are: the EBS dimension, with 5 items; its saturations range between (0.67-0.84), then the ELS dimension, which has 4 items; its saturations range between (0.61-0.82), then the EBC dimension, and it has 3 items; its saturations range between (0.77-0.84).

Table 3-61 shows that the EFA in the sixth time; extracting three components that have a latent root greater than the reference value (1) explains together the amount of (63.41%) of the total cumulative explanatory variance of the items of the moral behavior scale, with an explanatory variance for the first component that exceeds (20%), where its value reached (35.67%).

**Table 3-61: The results of the KMO test and the Bartlett test for sphericity and the values of the correlation coefficients for the components of the EFA of the items of ethical behavior for the sixth time**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative%	Total	% Of Variance	Cumulative%
1	4.28	35.67	35.67	4.28	35.67	35.67
2	1.92	15.96	51.63	1.92	15.96	51.63
3	1.41	11.78	63.41	1.41	11.78	63.41
4	0.78	6.47	69.88			

Table 3-62 shows the values of correlation coefficients between the components that the EFA sorted in the sixth time for the ethical behavior items, followed by the KMO test result, which has a value of (0.82), which indicates the appropriateness of the ethical behaviour scale for

EFA, followed by the Bartlett test result for sphericity that its value is (2848.96) with statistical significance ( $\alpha = 0.05$ ).

**Table 3-62: the results of the EFA of the ethical behavior items for the sixth time**

Component	1	2	
2	0.23*		
3	0.37*	0.31*	
KMO and Bartlett's Test <sup>(1)</sup>			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. $\chi^2$	df	Sig.
0.82	2548.96*	66	0.00

<sup>(1)</sup> Based on correlations

\*  $p \leq 0.05$

### 3.1.6.3 Ethical behaviour Confirmatory Factor Analysis

The confirmatory factor analysis (CFA) validity was verified by following the following steps:

#### **CFA First Step: building a CFA model for the membership of ethical behavior scale items to its dimensions.**

Considering the results of the sixth time for EFA analysis; the CFA model was built for testing the ability of ethical behavior dimensions (i.e., EBS, EBC, and ELS) to predict its items. In order to be able to test its own null hypotheses which stated: *“There is no statistically significant predictive ability at the alpha level ( $\alpha = 0.05$ ) for ethical behavior dimension (EBS) with its paragraphs, and there is no statistically significant predictive ability ( $\alpha = 0.05$ ) for the dimension of ethical behavior (EBC) with its paragraphs, and there is no statistically significant predictive ability ( $\alpha = 0.05$ ) for ethical behavior dimension (ELS) with its paragraphs”*, as shown in Figure 3-8.

**Figure 3-8: CFA model based on the results of the sixth EFA model of the ability of ethical behaviour dimensions to predict its items, including the texts of the items**



### CFA Second Step: Excluding Outliers

The *Mahalanobis* distance was calculated for all members of the study sample with a total of (567) from the Jordanian public hospital employees while conducting a CFA of the ethical behavior dimensions’ (i.e., EBS, EBC, and ELS) ability to predict its items; to detect individuals who abuse the possibility of matching the CFA model as shown in Table 3-63.

It is evident from Table 3-63 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the calculated *Mahalanobis* distance values for 65 employees of the hospitals staff from the data center of the ethical behavior dimensions capacity to predict its items, which required their dropping from the dataset to be able to repeat the CFA on the data of the remaining (502) with clean dataset.

**Table 3-63: The results of the Mahalanobis distance test for the individuals who are far from a data center in the CFA model of the ethical behaviour dimension's ability to predict its items**

SN	Case ID	Mahalanobis $d^2$	$p_1$	$p_2$
1	164	40.60*	0.000	0.032
2	237	39.68*	0.000	0.001
3	319	39.25*	0.000	0.000
4	271	38.76*	0.000	0.000
5	388	36.97*	0.000	0.000
6	51	36.91*	0.000	0.000
7	278	33.51*	0.001	0.000
8	289	32.91*	0.001	0.000
9	432	32.48*	0.001	0.000
10	184	32.27*	0.001	0.000
11	177	31.88*	0.001	0.000
12	383	31.34*	0.002	0.000
13	433	31.08*	0.002	0.000
14	428	30.86*	0.002	0.000
15	292	30.63*	0.002	0.000
16	282	30.57*	0.002	0.000
17	41	30.46*	0.002	0.000
18	515	30.10*	0.003	0.000
19	247	29.92*	0.003	0.000
20	321	29.11*	0.004	0.000
21	541	29.07*	0.004	0.000
22	403	28.99*	0.004	0.000
23	173	28.64*	0.004	0.000
24	391	28.59*	0.005	0.000
25	394	28.48*	0.005	0.000
26	389	28.10*	0.005	0.000
27	437	28.07*	0.005	0.000
28	476	27.48*	0.007	0.000
29	417	27.26*	0.007	0.000
30	416	26.88*	0.008	0.000
31	504	26.78*	0.008	0.000
32	59	26.76*	0.008	0.000
33	439	26.75*	0.008	0.000
34	145	26.42*	0.009	0.000
35	413	26.33*	0.010	0.000
36	98	26.11*	0.010	0.000
37	418	25.82*	0.011	0.000
38	524	25.39*	0.013	0.000
39	134	25.24*	0.014	0.000
40	410	24.80*	0.016	0.000
41	518	24.40*	0.018	0.000
42	551	24.11*	0.020	0.000
43	399	24.03*	0.020	0.000
44	424	23.99*	0.020	0.000

SN	Case ID	Mahalanobis $d^2$	$p_1$	$p_2$
45	558	23.89*	0.021	0.000
46	473	23.78*	0.022	0.000
47	425	23.75*	0.022	0.000
48	557	23.57*	0.023	0.000
49	386	23.52*	0.024	0.000
50	260	22.93*	0.028	0.000
51	414	22.92*	0.028	0.000
52	510	22.84*	0.029	0.000
53	259	22.72*	0.030	0.000
54	100	22.25*	0.035	0.000
55	527	21.94*	0.038	0.000
56	140	21.80*	0.040	0.000
57	502	21.71*	0.041	0.000
58	489	21.70*	0.041	0.000
59	484	21.61*	0.042	0.000
60	136	21.45*	0.044	0.000
61	346	21.43*	0.044	0.000
62	490	21.42*	0.045	0.000
63	483	21.33*	0.046	0.000
64	395	21.21*	0.047	0.000
65	2	21.19*	0.048	0.000

\*  $p \leq 0.05$

### CFA Third Step: Multivariate normal distribution tests for ethical behaviour dimensions

The skewness and kurtosis indicators of the ability of the ethical behaviour dimensions model were calculated to predict its items. To reveal the violation of the assumption of a multivariate normal distribution of the responses of the study sample members to the items of the ethical behaviour dimensions Model towards public service, as shown in Table 3-64.

**Table 3-64: the results of the skewness and kurtosis indices of ethical behavior dimension's ability model to predict its items**

Factor	Item ID	Assessment of normality					
		Range of Means		Skewness		Kurtosis	
		Min.	Max.	Statistic	CR	Statistic	CR
EBS	1	1	5	-0.28	-2.464*	-0.74	-3.272*
	2	1	5	-0.18	-1.599	-0.66	-2.911*
	3	1	5	-0.10	-0.908	-0.55	-2.404*
	4	1	5	-0.28	-2.493*	-0.51	-2.264*
	5	1	5	-0.32	-2.799*	-0.61	-2.681*
EBC	3	1	5	-0.37	-3.293*	-0.64	-2.832*
	4	1	5	-0.41	-3.604*	-0.68	-2.986*
	5	1	5	-0.49	-4.338*	-0.47	-2.068*
ELS	5	1	5	-0.17	-1.515	-0.71	-3.144*
	6	1	5	-0.23	-2.044*	-0.68	-2.985*
	7	1	5	0.16	1.378	-0.87	-3.814*
	8	1	5	0.23	2.013*	-0.85	-3.750*
Mardia's (1970) coefficient of multivariate kurtosis						11.11	6.551*

\*  $p < 0.05$

It is clear from Table 3-64 that the absolute value of the skewness coefficient did not increase for any paragraph of ethical behaviour dimensions to predict its items from criterion (2), where its absolute values ranged between (0.10-0.49). It is clear that the absolute value of the kurtosis coefficient of any paragraph of the model variables did not exceed the standard value of (7), as its absolute values ranged between (0.47-0.84), which is within the rule of thumb (West, et al., 1995).

Nevertheless, in this model the researcher applied the same procedures in PSM while conducting CFA model by applying (The bootstrap) method based on the MLE using the parametric Monte Carlo method (Cheung & Lau, 2008) as a precautionary measure, despite not violating the assumption of a multivariate normal distribution of the responses of the study sample to the model variables according to the Mardia (1970) standardized coefficient value for multivariate kurtosis, which was not statistically significant ( $\alpha = 0.05$ ), it reached (6.551), by taking the mean of the results of (200) random samples taken from the data of the 502 employees of hospital staff in Jordan; in order to ensure the stability and validity of CFA results later on, because this method is considered one of the indicators of accuracy that is used as an alternative to inferential statistics based on assumptions specific to the



model when those assumptions are questionable and not fulfilled in this case.

**CFA Fourth Step: Processing the values of the extreme adjustment indicators between the pairs of measurement errors of the ethical behaviour dimensions**

The values of the assumed extreme adjustment indicators were monitored between pairs of measurement errors of ethical behaviour dimensions items (i.e., EBS, EBC, and ELS) that exceed criterion (4), and only the extreme adjustment indicators were treated with the positive orientation in the amount of its parameter changes by creating a covariance coefficient (standardized correlation) between each pair of paragraph measurement errors for each dimension of the PSM scale. The predictions are made separately, as shown in Table 3-65.

It is noted from Table 3-65 that four pairs of measurement errors of the predicted dimensions of the ethical behavior were treated [(ELS; by one pair), and (EBS: by three pairs)], in light of their extreme adjustment indicators values that have a positive orientation in the amount of their parameters change that exceeds the standard (4) by creating covariances (standardized correlations); and that within the first (Unfitted) model.

Correspondingly, it is noted that one pair of item measurement errors pairs for the predicted EBS dimension was treated in light of the value of its extreme adjustment index with a positive direction in the amount of its parameter change that exceeds standard (4) by creating a covariance (standard correlation); this is within the second (Unfitted) model.



**Table 3-65:** The values of the assumed extreme adjustment indices for the unstandardized coefficient's covariance between each pair of item measurement errors for each dimension of the ethical behaviour scale separately, and the status of their treatment in the unfitted model

FAC TOR	Covariance between operands of the pair			Model						STATUS
	First	↔	Second	First		Second		Third		
				MI	Par Change	MI	Par Change	MI	Par Change	
ELS	e11	↔	EBC	5.7	-0.10					
	e11	↔	e12	13.7*	0.16					<i>Treated within its dimension</i>
	e10	↔	EBC	15.8	0.14	9.3	0.11	8.7	0.10	
	e10	↔	EBS	10.5	-0.10	14.6	-0.12	12.7	-0.11	
EBC	e9	↔	EBS	20.2	0.15	21.2	0.15	18.4	0.15	
	e8	↔	e12	6.3	-0.11	4.5	-0.09	4.5	-0.09	
	e8	↔	e10	11.2	0.13	9.7	0.12	9.6	0.12	
	e4	↔	ELS					4.1	-0.05	
EBS	e3	↔	ELS	9.8	0.08	10.4	0.08	13.0	0.09	
	e3	↔	EBC	4.7	-0.06	6.1	-0.07			
	e3	↔	e9	19.9	0.13	20.4	0.13	19.6	0.13	
	e3	↔	e8	7.8	-0.08	5.9	-0.07	4.4	-0.06	
	e3	↔	e5	7.1	-0.07	4.2	-0.05			
	e3	↔	e4	9.2*	0.06					<i>Treated within its dimension</i>
	e2	↔	e4	4.9	-0.04					
	e2	↔	e3			6.1*	0.05			<i>Treated within its dimension</i>
E1	e1	↔	e12	5.1	-0.08	4.9	-0.08	4.5	-0.07	
	e1	↔	e8	15.1	0.14	12.5	0.12	11.5	0.12	
	e1	↔	e5	8.8*	0.09					<i>Treated within its dimension</i>
	e1	↔	e3	13.3	-0.09					
	e1	↔	e2	6.3*	0.06					<i>Treated within its dimension</i>

\* MI: Should be treated if it is greater than criterion (4) and if its par. Change is positive

It is noted from Table 3-65 that four pairs of measurement errors of the predicted ethical behavior dimensions were treated [(ELS; by one pair), and (EBS: by three pairs)] in light of adjusting indicators values and the values who have positively oriented outliers in the amount of their parameter change in excess of criterion (4) by creating covariances (standardized correlations); and that within the first (Unfitted) model. It is noted that one pair of item measurement errors pairs concerning the EBS dimension was treated in light of the value of its extreme adjustment index with a positive direction in the amount of its parameter change that exceeds standard (4) by creating a covariance (standardized correlation); where this is within the second (Unfitted) model.

**CFA Fifth Step: Estimating the indicators of the CFA model of ethical behaviour dimension's ability to predict its items**

The values of fit indices [ $\chi^2$ ,  $\chi^2/df$ , SRMR, GFI, AGFI, NFI, IFI, TLI, CFI (RNI), RMSEA, Information Criteria (AIC, BCC, BIC, CAIC)] for the two models of the ability of ethical behavior dimensions (i.e., EBS, EBC, and ELS) to predict their items after and before treating the values of the assumed extreme adjustment indicators between each pair of item measurement errors of the predicted ethical behavior dimensions in the first model (Unfitted), then the preference of the third model over the first model was calculated using the equation for the difference between the values of  $\chi^2$  for the two models, and the comparison between the values of their fit indices, as shown in Table 3-66.

**Table 3-66: The result of the equation of the difference between the two values of  $\chi^2$  for the two models of the ability of ethical behavior to predict its items after and before treating the values of the assumed extreme adjustment indicators between each pair of measurement errors of items dimensions ethical behavior predicted in the first (Unfitted) model, and compare the values of the fit indices**

Fit Indices		Comparison between values of			Which model fitting more?
		Third Fitted	Second Unfitted	First Unfitted	
Description	Criterion	Models for treated EB scale by PCA			
Number of distinct sample moments		78	78	78	
Number of distinct parameters to be estimated		32	31	27	Third
$C_{min}-(\chi^2)$		110.67*	124.34*	168.59*	57.92*
Degrees of freedom (78-xx)		46	47	51	5
Sig.		0.000	0.000	0.000	0.000
$C_{min}/df=(\chi^2/df)$	< 5	2.41&	< 2.65&	< 3.31#	Third
<b>RMR(SRMR)</b>	< 0.08	0.054	< 0.056	< 0.062	Third
GFI	> 0.95	0.962	> 0.957	> 0.941	Third
AGFI	> 0.90	0.936	> 0.928	> 0.91	Third
<b>NFI</b>	$\delta_1$ > 0.95	0.961	> 0.956	> 0.94	Third
<b>IFI</b>	$\delta_2$ > 0.90	0.977	> 0.972	> 0.958	Third
<b>TLI</b>	$\rho_2$ > 0.95	0.966	> 0.961	> 0.945	Third
<b>CFI(RNI)</b>	> 0.90	0.977	> 0.972	> 0.957	Third
<b>RMSEA</b>	< 0.08	0.055	< 0.059	< 0.07*	Third
CI of 90%	Lower Limit 90%	0.042	0.047	0.059	
	Higher Limit 90%	0.068	0.072	0.082	
Sig. for Hypothesis of (P close)		0.253	> 0.105	> 0.002	Third
<b>AIC</b>	< the previous model	174.67	< 186.34	< 222.59	Third
<b>BCC</b>	< the previous model	176.50	< 188.12	< 224.14	Third
<b>BIC</b>	< the previous model	307.35	< 314.87	< 334.54	Third
<b>CAIC</b>	< the previous model	339.35	< 345.87	< 361.54	Third

& Goodness-of-fit: Within the threshold of Criterion (3); # Acceptable: Within the threshold of Criterion (5), \*  $p \leq 0.05$

It is noticed from Table 3-66 that all fit indices of the CFA model in the third (Fitted) model are achieved after processing the extreme adjustment indicators that exceed criterion (4) in the following models: [the second (Unfitted), then the first (Unfitted)] between each pair of pairs measurement errors of the ethical behavior dimensions (i.e., EBS, EBC, and ELS) in the CFA model of the ethical behavior dimensions ability to predict its items based on the results of the EFA compared to what it was in the following models: [second (Unfitted), then first (Unfitted)]; whereas, the  $\chi^2/df$  ratio is perfectly matched for being less than standard (3), the conformity index values (GFI, NFI, TLI) are greater than the standard (0.95), and the conformity index values (AGFI, IFI, CFI(RNI)) greater than the standard value of (0.90), the values of the two fit indices (SRMR, REMSEA) became less than the standard (0.08), and all the values of the information criterion (AIC, BCC, BIC, CAIC) in the third (Unfitted) model became less than in the form the first (Unfitted) model.

In addition to the above, the difference between the values of  $\chi^2$  for the third (Fitted) and the first (Unfitted) models was (57.92) at the absolute value of five degrees of freedom of the difference between the degrees of freedom of the third and first models (ABS(46-51)) was statistically significant ( $\alpha = 0.05$ ); to calculate the third (Fitted) model because it has a smaller  $\chi^2$  value of (110.67) than it is in the first (Unfitted) model because it has a larger  $\chi^2$  value of (168.59).

### **CFA Sixth Step: Estimation of the unstandardized and standardized regression coefficients of the ability of ethical behavior dimensions to predict its items**

The critical ratios of the estimated unstandardized regression coefficients values to their standard errors of the third (Fitted) model were calculated for the ability of the ethical behaviour dimensions (i.e., EBS, EBC, and ELS) to predict its items, in addition, to estimate their standardized regression coefficients, as shown in Table 3-67.

**Table 3-67: Standardized and unstandardized regression coefficients of the ethical behaviour dimensions model to predict their items**

Paths for treated EB scale by PCA			Estimates of:			CR	Sig.	R <sup>2</sup>
Item ID	← Factor	B	se of B	Standardized Regression Weights $\beta$				
1	←	1		0.73			52.5%	
2	←	1.06	0.06	0.80	16.75*	0.00	64.1%	
3	← EBS	0.96	0.07	0.76	13.03*	0.00	57.4%	
4	←	1.02	0.07	0.81	14.25*	0.00	66.2%	
5	←	0.98	0.07	0.72	14.91*	0.00	51.9%	
3	←	1		0.88			76.9%	
4	← EBC	1.07	0.04	0.94	24.19*	0.00	88.5%	
5	←	0.65	0.05	0.59	13.85*	0.00	34.6%	
5	←	1		0.69			47.1%	
6	← ELS	1.11	0.09	0.78	12.60*	0.00	60.9%	
7	←	0.88	0.08	0.59	10.41*	0.00	34.8%	
8	←	0.87	0.08	0.60	10.58*	0.00	36.0%	

\*  $p \leq 0.05$

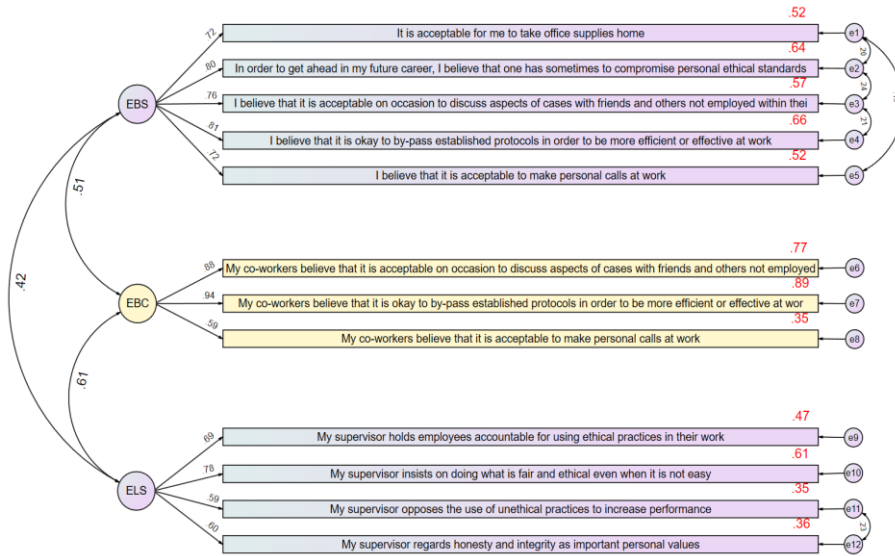
It is clear from Table 3-67 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the estimated unstandardized regression coefficients for the ability of the ethical behavior dimension [EBS] of the Jordanian hospital staff in hospitals to predict its items and the reference values for its null hypotheses, which are (zero). The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors are greater than the Z value (+1.96) corresponding to the adopted significance level; which indicates rejecting of the null hypotheses that stated: “*There is no statistically significant predictive ability ( $\alpha = 0.05$ ) for the dimension of ethical behaviour (EBS) in the Jordanian hospitals in its paragraphs*”; where it is clear EBS in the Jordanian hospitals explains (51.9% to 66.2%) of the paragraphs attached to it, as shown in Figures 3-9 and 3-10.

It is also evident from Table 3-67 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the estimated unstandardized regression coefficients for the ability of the ethical behavior dimension [EBC] of the Jordanian hospital staff in hospitals to predict its items and the reference values for its null hypotheses, which are (zero). The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors are greater than the Z value (+1.96) corresponding to the adopted significance level; which indicates rejecting of the null hypotheses that stated: “*There is no statistically significant predictive ability ( $\alpha = 0.05$ ) for the dimension of ethical behaviour (EBC) in the Jordanian hospitals in its paragraphs*”; where it is clear EBS in the Jordanian hospitals explains (34.6% to 88.5%) of the items attached to it, as shown in Figures 3-9 and 3-10.

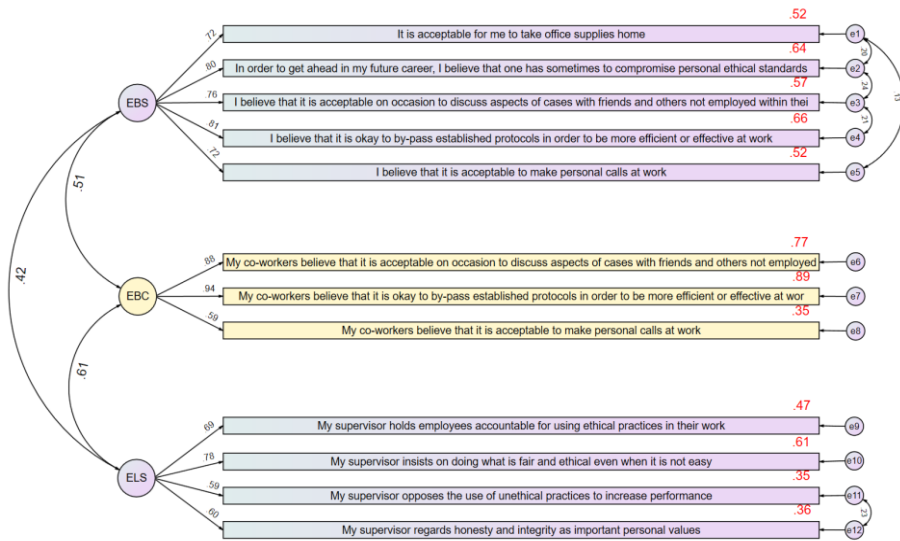
It is also evident from Table 3-67 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the estimated unstandardized regression coefficients for the ability of the ethical behavior dimension [ELC] of the Jordanian hospital staff in hospitals to predict its items and the reference values for its null hypotheses, which are (zero). The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors are greater than the Z value (+1.96) corresponding to the adopted significance level; which indicates rejecting of the null hypotheses that stated: “*There is no statistically significant predictive ability ( $\alpha = 0.05$ ) for the dimension of ethical*

*behaviour (ELS) in the Jordanian hospitals in its paragraphs*”; where it is clear ELS in the Jordanian hospitals explains (34.8% to 60.9%) of the items attached to it, as shown in Figures 3-9 and 3-10.

**Figure 3-9: The values of the estimated standardized regression coefficients of the ability ethical behaviour dimensions CFA model to predict its items based on the results of the EFA**



**Figure 3-10: The values of the estimated unstandardized regression coefficients of the ability ethical behaviour dimensions CFA model to predict its items based on the results of the EFA**



The next table (Table 3-68) shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the unstandardized covariances coefficients for [ethical behaviour and its dimensions (i.e., EBS, EBC, and ELS)] and the reference values of its hypotheses, which are (zero). Which ranged between (0.28-0.51) with standard errors ranging between (0.04-0.06), where the values of the critical ratios of the estimated unstandardized covariances coefficients to their standard errors were greater than the Z value (+1.96) that corresponds to the adopted significance level. Which reflects the fact that the estimated values of the standard correlation coefficients for the predictors [ethical behavior and its dimensions (i.e., EBS, EBC, and ELS)], ranged between (0.42-0.61). The results also shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the unstandardized covariances coefficients for (EBC and ELS) and the reference values of its hypotheses, which are (zero), that ranged between (0.08-0.21) with standard errors that ranged between (0.03-0.05), where the values of the critical ratios of the estimated unstandardized covariances coefficients to their standard errors were greater than the Z value (+1.96), that corresponds to the adopted



significance level. It also shows the values of the standard correlation coefficients arising from the treatment of the values of the extreme adjustment indicators of the estimated predicted pairs of item measurement errors in the two dimensions of ethical behavior (EBS and ELS) that ranged between (0.13-0.24).

**Table 3-68: The estimated values of the critical ratios of the standardized and standardized covariances for ethical behaviour CFA model to predict its items**

Relation between the operands of the pair			Estimates of:			CR	Sig.
First	↔	Second	Unstandardized	Standardized			
			Covariance	se of Covariance	Correlation		
EBS	↔	EBC	0.43	0.05	0.51	7.94*	0.00
EBS	↔	ELS	0.28	0.04	0.42	6.23*	0.00
EBC	↔	ELS	0.51	0.06	0.61	8.52*	0.00
ELS	e <sub>11</sub> ↔	e <sub>12</sub>	0.21	0.05	0.23	3.88*	0.00
	e <sub>1</sub> ↔	e <sub>5</sub>	0.08	0.04	0.13	2.12*	0.03
EBS	e <sub>3</sub> ↔	e <sub>4</sub>	0.09	0.03	0.21	2.74*	0.01
	e <sub>1</sub> ↔	e <sub>2</sub>	0.10	0.03	0.20	2.91*	0.00
	e <sub>2</sub> ↔	e <sub>3</sub>	0.11	0.03	0.24	3.68*	0.00

\*  $p < 0.05$

Note: The table reveals the estimated values of the critical ratios of the unstandardized and standardized covariances coefficients to their standard errors, the values of the estimated standardized correlation coefficients for the predictors [ethical behaviour], and the values of the critical ratios of the coefficients of the unstandardized coefficients to their standard errors, and estimated values arising from the treatment coefficients outliers modifier predicted values for item measurement error pairs in two dimensions of public service motivation (EBS, ELS).

Table 3-69 shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the estimated unstandardized variance values for the predictors [ethical behaviour and its dimensions (i.e., EBS, EBC, and ELS)] and the reference values for its hypotheses, which are (zero). It shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the estimated unstandardized variance values for the measurement errors of its predicted dimensions and the reference values for its null hypothesis, which is (zero).

**Table 3-70: The values of the critical ratios of the estimated unstandardized coefficients to their standard errors of ethical behaviour dimensions, and of the measurement errors of its predicted items.**

Variances for Exogenous Variables	Estimates of:		CR	Sig.	
	Variance	se of Variance			
EBS	0.67	0.08	8.05*	0.00	
EBC	1.07	0.09	11.36*	0.00	
ELS	0.65	0.09	7.46*	0.00	
EBS	e <sub>1</sub>	0.60	0.06	10.98*	0.00
	e <sub>2</sub>	0.41	0.04	9.79*	0.00
	e <sub>3</sub>	0.45	0.05	9.92*	0.00
	e <sub>4</sub>	0.35	0.04	9.17*	0.00
	e <sub>5</sub>	0.59	0.05	11.97*	0.00
EBC	e <sub>6</sub>	0.32	0.04	8.44*	0.00
	e <sub>7</sub>	0.16	0.04	4.23*	0.00
	e <sub>8</sub>	0.86	0.06	14.55*	0.00
ELS	e <sub>9</sub>	0.72	0.06	11.55*	0.00
	e <sub>10</sub>	0.51	0.06	8.82*	0.00
	e <sub>11</sub>	0.93	0.07	12.86*	0.00
	e <sub>12</sub>	0.87	0.07	12.74*	0.00

\*  $p \leq 0.05$

### **3.1.6.3 Verifying the composite reliability, convergent validity, and discriminant validity of ethical behaviour dimensions.**

In the light of the results of Table 3-66; composite reliability, and convergent validity of ethical behaviour dimensions, were estimated. Furthermore, considering the results of Table 3-67; the discriminant validity of the ethical behaviour dimensions was also estimated, as shown in Table 3-71.

**Table 3-71: The values of composite reliability, convergent, and discriminant validity values of ethical behavior and its dimensions**

<b>EB &amp; Dimensions</b>	<b>CR</b>	<b>AVE</b>	<b>SQRT(AVE)</b>
EBS	0.875	0.585	0.765
EBC	0.853	0.667	0.817
ELS	0.761	0.447	0.669
Overall Scale	0.937	0.559	
Criterion; Greater than:	0.700	0.490	Values of its Intraclass correlation with Other Dimensions

It is clear from Table 3-71 that the composite reliability value of the ethical behavior scale is (0.937), and its values for the dimensions of the scale ranged between (0.761-0.875); where all the composite reliability values were greater than the standard (0.70). It is clear that the value of the convergent validity of the scale was (0.559), and its values for the two dimensions of the scale (i.e., EBS and EBC) ranged between (0.585-0.667). Where their values are greater than the threshold of (0.49). While the convergent validity value of the ELS dimension was not greater than the threshold (0.49); it amounted to (0.447).

Table 3-72 shows the extent to which the discriminant validity of ethical behavior dimensions was achieved by comparing the square root values of convergent validity (SQRT(AVE)) with the values of the inter-correlation coefficients of the scale dimensions. It is clear from Table 3-72 that all the discriminant validity values were greater than any correlation coefficient for ethical behavior dimensions, which emphasizes verifying the discriminant validity between the dimensions of the scale.

**Table 3-72: The values of the discriminant validity coefficients compared to the values of the intraclass correlation coefficients of ethical behavior dimensions**

<b>Intraclass Correlations</b>	<b>EBS</b>	<b>EBC</b>	<b>ELS</b>
EBS	<b>0.765</b>		
EBC	0.511	<b>0.817</b>	
ELS	0.422	0.614	<b>0.669</b>

#### **3.1.6.4 Internal consistency of ethical behavior scale**

Corrected Item-Total Correlation coefficients <sup>(7)</sup> were calculated for the relationship of the ethical behaviour paragraphs and their dimensions; as indicators of the reliability of the internal consistency of scale building, items, and its dimensions, as shown in Table 3-73.

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<sup>7</sup> Statistically wise; the item-corrected correlation coefficient is more accurate than the Pearson correlation coefficient; where it takes into account the specificity of the paragraph from being of a categorical scale arranged in contrast to being continuous, and because it is calculated after deleting the response value on the scale/dimension paragraph concerned in ethical behaviour; which gives the pure correlation of the relationship of the paragraph with its scale/dimension among the staff of Jordan's public hospitals.

**Table 3-73: Corrected correlation coefficient values for the relationship of ethical behaviour paragraphs and their dimensions**

Dimension & Item ID	Context for items of EB Scale	Corrected Item-Total Correlation	
		Dimension	Scale
<b>EBS: Ethical Behavior of Self</b>			
2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	0.71*	0.56*
3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.66*	0.53*
4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.68*	0.55*
1	<i>It is acceptable for me to take office supplies home</i>	0.66*	0.55*
5	<i>I believe that it is acceptable to make personal calls at work</i>	0.60*	0.52*
<b>ELS: Ethical Leadership</b>			
7	<i>My supervisor opposes the use of unethical practices to increase performance</i>	0.55*	0.35*
8	<i>My supervisor regards honesty and integrity as important personal values</i>	0.54*	0.36*
5	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	0.48*	0.45*
6	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	0.53*	0.47*
<b>EBC: Ethical Behavior of Co-workers</b>			
3	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	0.69*	0.54*
4	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	0.70*	0.58*
5	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	0.44*	0.40*

\*  $p \leq 0.05$

It is noted from Table 3-73 that the values of the Corrected Item-Total Correlation for the relationship of EBS paragraphs its dimension ranged between (0.60-0.71), and its scale ranged between (0.52-0.56), the values of the corrected correlation coefficients for EBC with their dimension ranged between (0.48-0.55), and their scale ranged between (0.35-0.47), and the values of the corrected correlation coefficients for the ELS in their dimension ranged between (0.44-0.70), and their scale ranged between (0.40-0.58).

It is noted from the values related to the validity of the construction (consistency of homogeneity between the contents of the paragraphs of the scale, and consistency of homogeneity between the contents of the paragraphs of the dimensions of the scale separately); that the calculated values of the item discriminant coefficients (corrected correlation of the relation of items with the scale and its dimensions) did not fall below its critical value of (0.08215), which is calculated according to (t) test <sup>(8)</sup> which tests the null hypothesis which states that “*The calculated corrected correlation coefficient value does not differ from zero ( $\alpha = 0.05$ )*” at (565) degrees of freedom, which indicates the quality of constructing the paragraphs of the dimensions of ethical behavior scale.

Furthermore, the researcher calculated Pearson’s correlation coefficients for the relationship of the ethical behavior scale with its dimensions, in addition to calculating the Pearson’s interrelationship coefficients for the dimensional relationship, as shown in Table 3-74.

**Table 3-74: The values of the correlation coefficients of the ethical behavior scale with its dimensions, and the values of the interrelationship’s coefficients of its dimensions**

<b>Correlation</b>	<b>EBS</b>	<b>ELS</b>	<b>EBC</b>
ELS	0.27*		
EBC	0.41*	0.35*	
Whole EB Scale	0.80*	0.70*	0.74*

\*  $p \leq 0.05$

It is noticed from Table 3-74 that the values of Pearson’s correlation coefficients ranged between (0.70-0.80) and that the values of the Pearson correlation coefficients for the relationship of the ethical behavior scale dimensions ranged between (0.27-0.41); this indicates that the three dimensions constitute the features of the ethical behavior and reflect it.

Also, it is noted that the calculated Pearson correlation coefficients for the scale's relationship to their dimensions did not fall below its critical value of (0.08215), which is calculated according to the (t) test at (565) degrees of freedom, indicates the quality of the dimension's representation of the ethical behavior sample members included in the study.

### 3.1.6.5 PSM Scale Reliability

For the aim of calculating the reliability via internal consistency of ethical behavior and its dimensions as in section 3.1.5.5; reliability analysis using *Cronbach's alpha* indicator -equation- was used <sup>(9)</sup>, and *McDonald's Omega* was also used; this is based on the fundamental (original) sample data, as shown in Table 3-75.

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$\rho_{standardized} = \frac{(k\bar{r})}{[1 + (k - 1)\bar{r}]}$ ; where  $k$  is the number of items,  $\bar{r}$  is the mean of correlation Coefficients among items of dimension.



Table 3-75: the values of internal consistency coefficients of the ethical behavior scale and its dimensions

EB Scale & Dimensions	Reliability Statistics							N of Items
	Cronbach's $\alpha$ Based on Standardized Items					McDonald's $\Omega$		
	Value	Classification <sup>&amp;</sup>	Inter-Item Correlations			Value	Classification <sup>&amp;</sup>	
			Minimum	Mean <sup>+</sup>	Maximum			
EBS	0.851	Very Reliable	0.43	0.53	0.62	0.848	Very Reliable	5
EBC	0.770	Reliable	0.41	0.53	0.75	0.795	Reliable	4
ELS	0.736	Reliable	0.36	0.41	0.49	0.734	Reliable	3
Whole Scale	0.831	Very Reliable	0.04	0.29	0.75	0.811	Very Reliable	12

Note: Arithmetic means of the scale/dimension vertebrae correlation coefficient under the main diameter of its vertebrae correlation + matrix

<sup>&</sup> The process of classifying the values of the internal consistency stability coefficients were carried out according to (Schermelleh-Engel, Moosbrugger, and Müller, 2003) standard



It is noticed from Table 3-75 that the internal consistency reliability of the scale reached its value (0.831), while the values of the internal consistency reliability coefficients of its dimensions ranged between (0.736-0.851) for them; which indicates the variation in the strength of the internal consistency coefficients according to Cronbach's alpha for the ethical behaviour scale and its dimensions for the difference in arithmetic means of the correlation coefficients between the scale/dimension paragraphs under the main diameter of the matrices of those coefficients between (Reliable to Very Reliable) according to (Schermelleh-Engel, Moosbrugger, and Müller, 2003), and due to the difference in the number of paragraphs of the scale/dimensions; this indicates, as a standard, that there is no violation of the homogeneity of the contents of items within the ethical behavior scale and its dimensions separately, and a violation of the homogeneity of variance among the study sample respondents responding to the items and dimensions of the scale, and the reliability of the internal consistency of the scale was (0.811), while the values of the internal consistency coefficients of its dimensions ranged between (0.734-0.848) for them; this indicates the variation in the strength of the internal consistency reliability coefficients according to *McDonald's Omega* for the scale and its dimensions due to the difference of these coefficients between (Reliable to Very Reliable) according to the previous standard.

### 3.1.7 Correcting the study scale

In light of the construct validity results; in its final form, the scale of PSM included eleven items, which are answered in a Likert scale that includes five alternatives; they are: (strongly agree) who is given a score of (5) when corrected, or (agree) who is given a score of (4) when corrected, or (neutral) who is given a score of (3) when corrected, or (disagree) who is given a score of (2) when corrected, or (strongly disagrees) who is given a score of (1) when corrected.

Thus, the raw scores of the scale and its dimensions range between ((11-55) for the scale, (3-15) for the dimension of APS, and (4-20) for the dimensions SS and CPV), where the higher the raw score on the scale and its dimensions. These results would be an indication of the

increasing PSM characteristic and its measured dimensions and vice versa.

On the other hand, in the case of the ethical behavior scale; in its final form, the scale included twelve items, to be answered with a Likert scale that includes five alternatives the same as the PSM scale; They are: (strongly agree) who is given a score of (5) when corrected, or (agree) who is given a score of (4) when corrected, or (neutral) who is given a score of (3) when corrected, or (disagree) who is given a score of (2) when corrected, or (strongly disagrees) who is given a score of (1) when corrected.

Therefore, the raw scores of the scale and its dimensions range from ((12-60) for the overall scale, (5-25) for the EBS, (4-20) for the EBC, and (3-15) for the dimension of ELS)). Where the higher the raw score on the scale and its dimensions; was an indication of the increasing characteristic of the ethical behavior of Jordan's hospital staff in hospitals and its measured dimensions and vice versa.

The *Standard Scaling* statistical model based on the statistical significance of the value of the single-sample t-test was adopted in the process of evaluating the PSM level of Jordan's hospital staff and its measured dimensions and paragraphs, as it is based on a set of statistical indicators<sup>(10)</sup> that it takes into account that the current study is one of the detailed studies concerned with the specificity of each of the paragraphs of the dimensions of PSM, in contrast to the two commonly used statistical models with *Absolute Scaling* or *Relative Scaling* (Doran, 1980); those who adopt discretionary criteria in evaluating the level of PSM and its measured dimensions have no tangible mathematical weight according to clear-cut statistical indicators based

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<sup>10</sup> In evaluating the level of PSM and ethical behaviour, the measured dimensions and paragraphs of the statistical model take into account a set of statistical indicators. They are the two-arithmetic means (calculated and theoretical) and the standard error of the arithmetic mean computed in light of the standard deviation and the sample size represented by the (t) test for one sample according to its equation *One sample T – test* =  $(\bar{x} - \mu) / (sd / \sqrt{n})$ . While the two statistical models with absolute and relative gradations are based on the indicator (arithmetic mean) only as a statistical indicator according to non-binding discretionary criteria that do not fit with the specificity -details- of the paragraphs of PSM and ethical behaviour dimensions.

on (arithmetic mean) only as a statistical indicator; which leads to the issuance of ambiguous, non-conclusive and reliable judgments during the evaluation process for it and its dimensions and its consequent paragraphs (i.e.; absolute and relative gradations) during the development of cut-off degrees (classification) of the means of the viewpoint of the study members regarding their PSM and ethical behavior. This is done by comparing its means with the theoretical mean (Threshold), whose value is (3) for each of them; If the value of (t-test) is: (i) is greater than the cut-off score with a statistically significant difference ( $\alpha = 0.05$ ); the viewpoint of the study members on the scale and its dimensions and paragraphs is characterized as being of a high level; (ii) greater or less than the cut-off score with a non-statistically significant difference ( $\alpha = 0.05$ ); the viewpoint of the study members on the scale, its dimensions, and its items is characterized as being of a medium level, (iii) is smaller than the cut-off score with a statistically significant difference ( $\alpha = 0.05$ ); the viewpoint of the study members on the scale, its dimensions, and its paragraphs is of low level.

### 3.1.8 Over-claiming Scale

The terminology behind the concept of over-claiming is when the individuals -respondents- claim fake or non-existent knowledge when they answer self-reported questions or items (Williams, et al., 2001; Feeny & Goffin, 2015). Where sometimes under scrutiny and the lack of empirical evidence supporting the validity of the measure, taking over-claimers into consideration is highly recommended (Ludeke & Makransky, 2016).

As stated before, the aim of this thesis was to test the influence of PSM on ethical behavior and performance. Since organizational performance had been tested using secondary data; the only variables measured via self-reported measures are PSM and ethical behavior. Hence the guideline of Cohen's (1992) was utilized as follows: "strong" correlation is ( $\geq 0.50$ ), "moderate" is between 0.3 and 0.49, and "weak" is ( $< 0.30$ ). However, as explained in section 3.1.4 researcher used overclaiming scales to test the hypothesis as follows:

*H<sub>0.c.0.1</sub>*: Over-claimers report a higher level of ethical behaviour.

*H<sub>0.c.0.2</sub>*: Over-claimers report a higher level of public service motivation.

**Table 3-76: correlation between over-claimers, PSM, and ethical behaviour**

Variable	Over-claimers
Over-claimers	1.000
PSM	0.007*
Ethical Behaviour	0.004*

\*  $p \leq 0.05$

Nevertheless, the previous table (Table 3-76), indicates that the respondents of the study tend to be claiming the truth, and Overclaiming scale was positively associated with ( $p < 0.05$ ): PSM ( $r=0.007$ ) and ethical behavior ( $r=0.041$ ), but this correlation is under 0.3 which indicate a very weak association according to Cohen's (1992) cut-off.

### 3.1.8 PSM and Ethical Behaviour Statistical Procedures

Statistical treatments of the influence of PSM on ethical behaviour study data were carried out using the Statistical Package for Social Sciences (SPSS), as follows:

- To answer the first and second study questions; arithmetic means and standard deviations were calculated for each of: (PSM, its dimensions and items; ethical behaviour, its dimensions, and its items) among hospital staff in Jordanian public hospitals, followed by a t-test for each of them compared to the arithmetic mean of Likert scale.
- To answer the third and fourth study questions; arithmetic means and standard deviations were calculated for each of: (PSM, its dimensions and items; ethical behaviour, its dimensions, and its items) among hospital staff in Jordanian public hospitals according to gender, educational level, age, experience, administrative status, and job description, then the analysis of variance was performed via 6WAY ANOVA - without interaction - between the arithmetic means for each of: (PSM, and ethical behavior) according to the variables, then the Levin test was conducted according to the probability ( $F$ ) distribution to verify the equivalence of the variance errors between the arithmetic means of their ethical behaviour in it according to the variables.

Then the (*Scheffe*) test was used for multiple dimensional comparisons between arithmetic means of ethical behavior according to the

educational level. Then the Bartlett Sphericity Test was performed for the values of the inter-correlation coefficients for the dimensions of each PSM according to the sociodemographic variables, then the 6WAY-ANOVA multiple covariance analysis was conducted -without interaction- between the arithmetic means for the dimensions of: (PSM combined, and ethical behavior combined) according to the variables sociodemographic.

- To answer the fifth study question; the Structural Equation Modelling (SEM) approach has been used according to its steps was used to test the influence of PSM (with its dimensions) on ethical behavior (with its dimensions).

### **3.2 PUBLIC SERVICE MOTIVATION AND ORGANIZATIONAL PERFORMANCE**

In this part of the thesis, two-stage DEA models have been applied to investigate the influence of PSM on organizational performance in the efficiency context. In section 3.1, the methodology and the research procedures for this specific part of the dissertation have been described. In the current section, we will describe the measurement variables, sample, choosing the DEA indicators, and the general framework model. Next, we will assess the sample description using frequency distribution analysis, correlations, and DEA specifications. All the aforementioned analyses will be carried out using SPSS v.26, R Studio, and EViews v.11.

#### **3.2.1 Methodology**

In applied research, there are both parametric and nonparametric techniques dealing with the measurement of organizational performance that use efficiency as a measure. However, Data Envelopment Analysis is a widely accepted nonparametric method of capturing production efficiency by pointing out the efficient and inefficient DMUs. In this regard, [Jeremic et al. \(2012\)](#) stated that within the DEA models, the solution for improving inefficient units is to reach the efficiency boundary. Thus, there are two solutions to determining the inefficient units, namely, (i) decreasing inputs without reducing

outputs until the unit reaches the border <sup>(11)</sup>; (ii) increasing outputs without consuming more inputs, by reaching a unit of the efficiency <sup>(12)</sup> (Al-Refaie et al., 2014).

In this part of the study with the aim to explore the influence of PSM on organizational performance (defined by the concept of efficiency), determining the efficient and inefficient units is not enough. Therefore, the researcher here adopted a two-stage DEA methodology. In the first stage, DEA models were carried out to evaluate the degree of efficiency of the Jordanian public hospitals, a process that will be illustrated in the next subsections. The second stage focuses on exploring the influence of PSM with a set of other explanatory factors on the efficiency score from the first stage of DEA. Within-Between (WB) models with PSM as an explanatory variable are applied to find its influence on efficiency, after testing the model's specifications. Moreover, we used the Fixed Effects Filtered (FEF) estimators to estimate the influence of PSM as a time-invariant variable with other explanatory variables over efficiency scores. All of the above are performed in the MaxDEA Ultra V.8.0 to assess the efficiency score from the first stage of DEA, and EViews v.11 had been used to perform the second stage of DEA.

Consequently, this part of the study has the purpose to explore the influence of PSM on organizational performance in the Jordanian public hospitals with a total of 27 hospitals -see table 3-1. We use the secondary data from the JMoH for the period of 2019-2021 (with 81 observations), after taking the permission and ethical consideration from the person in charge within the JMoH. Also, we resort to the primary data from the PSM questionnaire for the years 2019-2020, to estimate the second stage of DEA as a hybrid perspective using both cross-sectional and longitudinal data.

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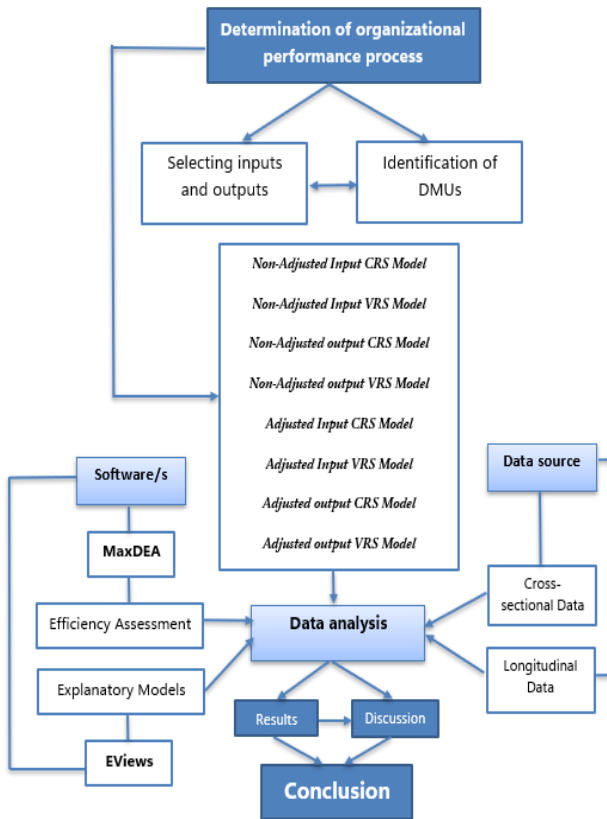
<sup>11</sup> According to the nature of this performance improvement, this approach is labelled as "input-oriented".

<sup>12</sup> According to the nature of this performance improvement, this approach is labelled as "output-oriented".

### 3.2.2 Framework of the second part of the study

The next figure (Figure 3-11) displays the framework of the second part of this thesis, as follows:

Figure 3-11: Main framework of the second part of the study



Source: own production

### 3.2.3 DEA Specifications

#### 3.2.3.1 Selection of indicators and data sources

Selecting the DEA model's indicators (i.e., inputs and outputs) is one of the most important and delicate steps in the DEA methodology, also there is no clear agreement on how to specify the inputs and outputs (Lee & Seo, 2017). For this reason, we do a literature scanning for the most connected and similar studies to match the nearest and available indicators in the context of Jordanian public hospitals, as shown in the next table:

**Table 3-78: Literature scanning of DEA Application in a public hospital**

Author/s	DMUs	Variables	
		Inputs	Outputs
Seddighi, et al. (2020)	16 middle eastern countries	Physicians/ Hospital beds/ Health Expenditures	Life expectancy/ Infant survival rate
Ngobeni, et al. (2020)	Southern African hospitals	Total health spending/ Health staff	Infant mortality rate
Jing, et al. (2020)	232 hospitals in China	Number of beds /Number of health technicians	Outpatients and emergency visit/ Inpatient discharges Revenue Outpatient visits/Discharged patients/Surgical operations/Laboratory tests/Radiology investigations/Mortality rate ANC recipients/Normal deliveries/Caesarean-section deliveries/PNC recipients/Outpatient department visits/Inpatient admissions
Alatawi, et al. (2020)	91 Saudi public hospitals	Hospital beds/Physicians/Nurses/Allied health personnel	ANC recipients/Normal deliveries/Caesarean-section deliveries/PNC recipients/Outpatient department visits/Inpatient admissions
Ahmed et al. (2019)	62 District hospitals in Bangladesh	Number of Doctors /Amount of Nurses/Number of Beds	Outpatients/Inpatients Weighted discharges/Emergencies/Surgical interventions
Tapia, et al. (2019)	12 Spanish health centers	Number of doctors/ Number of Nurses	Outpatients/Inpatients Weighted discharges/Emergencies/Surgical interventions
Fuentes, et al. (2019)	Public acute hospitals situated in Murcia (Spain)	Beds/ Operating rooms/Personnel costs/Operating cost	Outpatients/Inpatients Weighted discharges/Emergencies/Surgical interventions



Author/s	DMUs	Variables	
		Inputs	Outputs
Sultan & Crispim (2018)	11 public hospitals in West Bank (Palestine)	Hospital beds numbers/ Doctors FTEs/ Health FTEs/ Administrative FTEs	Inpatient days/ Outpatient visits/ Emergency care
Jiang, et al. (2016)	7 groups of general hospitals in Guangxi, China	Number of beds/ Number of medical staff/ Hospital expenditure/ Fixed asset	Person-time outpatient/ Discharged patients/ Revenue from health services
Al-Refaie et al. (2014)	All Jordanian public hospitals	Number of nurses/ Average time in the system	Nurses' utilization/ Number of served patients
Ajlouni et al. (2013)	All Jordanian public hospitals	Bed Days/Physicians/Health Personal	Patient Days/Minor Operations/Major Operations

It shows from the previous table (Table 3-78) that there are agreements in multiple indicators by researchers across the globe, where those matching were the starting point for this study to choose the best combination of inputs and outputs. Also taking the same indicators from the studies in the same country (Jordan) and its environs. Following the work of (Ajlouni, et al., 2013; Al-Refaie, et al., 2014; Sultan & Crispim, 2018; Tapia, et al., 2019; Jing, et al., 2020), we adopted the following indicators, as it shows in the next table:

Table 3-79: DEA adopted indicators

Variables/indicators	Coding
<b>Category</b>	
<b>Inputs</b>	
Beds Numbers	(I)BN
Human Cadres Numbers (FTEs) *	(I)HCN
Number of Physicians (FTEs)	(I)NoP
Supporting medical professions (FTEs)	(I)SMP
<b>Outputs</b>	
Outpatient visits	(O)OV
EM and Ambulance	(O)EMA
Number of Inpatients Entries	(O)NIE
Patient days	(O)PD

*Note:* \*Full-time equivalents

*Source:* researcher's own production

### 3.2.3.2 Number of Decision-Making Units (DUMs)

A general rule of thumb is that three decision-making units are needed for each input and output variable used in the model in order to ensure sufficient degrees of freedom for a meaningful analysis. The model in this dissertation has been built with the general rule that the total number of observations must be at least three times that of the total variables as stated by (López-Penabad, et al., 2020). This means there is no risk that an excessive number of the DMUs will be considered efficient by receiving a rating of one because of an inadequate number of degrees of freedom (Bowlin, 1998).

### 3.2.3.3 Positivity Property

Generally, the formulation of DEA requires that the input and output variables are positive (greater than zero; Charnes, Cooper, and Thrall, 1991). In this dissertation, as shown in the table (3-80), all the values of inputs and outputs are positive and greater than zero, which means that this requirement is not violated.

### 3.2.3.4 Isotonicity Property

It is clear from the next table (Table 3-80) that there is a positive correlation between the inputs and outputs, satisfying the *isotonicity property* that output does not decrease with an increase in the input (Hong and Jeong, 2019; López-Penabad, et al., 2020). This means that there is no need for further manipulation of the study variables (Chames et al., 1985).

The following correlation matrix analysis whether that inputs and outputs have a significant relationship with each other. The results illustrate that there is a positive correlation between inputs indicators, with a very strong correlation, but it is on the edge ( $r \leq 0.9$ ) to require further manipulation (Lee & Seo, 2017). Similarly, all of the output variables are correlated positively, where the highest correlation coefficient was (0.752).

**Table 3-80: Spearman's Correlations Matrix for DEA inputs and outputs to test the isotonic property**

	(I) BN	(I) HCN	(I) NOP	(I)SMP	(O) OV	(O) PD	(O)EME	(O)NIE
(I)BN	1							
(I)HCN	0.805	1						
<i>P-value</i>	0.000							
(I) NP	0.839	0.836	1					
<i>P-value</i>	0.000	0.000						
(I)SMP	0.813	0.889	0.852	1				
<i>P-value</i>	0.000	0.000	0.000					
(O) OV	0.659	0.731	0.733	0.732	1			
<i>P-value</i>	0.000	0.000	0.000	0.000				
(O) PD	0.919	0.856	0.811	0.850	0.563	1		
<i>P-value</i>	0.000	0.000	0.000	0.000	0.000			
(O)EMA	0.791	0.788	0.806	0.780	0.661	0.613	1	
<i>P-value</i>	0.000	0.000	0.000	0.000	0.000	0.000		
(O) NIE	0.917	0.878	0.858	0.858	0.593	0.752	0.654	1
<i>P-value</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

*Note:*  $p < .05$

The next table (Table 3-81) shows a descriptive analysis of the DEA indicators after extracting, organizing, cleaning, and debugging the data. The data had been obtained from the JMoH after taking their

permission from the period (2019 to 2021) with a total of 81 observations. It is worth mentioning that in this study we attempt to reduce the risk of outliers by ensuring the homogeneity of DMUs, on the basis that they have a common purpose of creating hospitals' efficiency, given the fact that all the Jordanian public hospitals are working under the same procedures, with same structure and strategies.

**Table 3-81: Descriptive statistics of DEA inputs and outputs variables**

	<b>(I) BN</b>	<b>(I) HCN</b>	<b>(I) NOP</b>	<b>(I)SMP</b>	<b>(O) OV</b>	<b>(O) PD</b>	<b>(O)EME</b>	<b>(O)NIE</b>
Median	110.000	385.000	62.000	266.000	80196.000	21597.000	81251.000	9201.000
Mean	159.148	563.160	134.728	364.568	107499.852	36486.272	121489.173	12788.272
Std. Error of Mean	22.215	64.311	21.363	38.735	11790.905	6308.453	12207.811	1836.030
Std. Deviation	199.931	578.803	192.264	348.612	106118.144	56776.080	109870.298	16524.267
Minimum	17.000	104.000	31.000	51.000	12854.000	572.000	12617.000	368.000
Maximum	1080.000	3313.000	989.000	2097.000	557392.000	319329.000	602013.000	99439.000
<i>Valid</i>	<i>81</i>	<i>81</i>	<i>81</i>	<i>81</i>	<i>81</i>	<i>81</i>	<i>81</i>	<i>81</i>
<i>Missing</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

### 3.2.3 DEA second stage specifications

#### 3.2.3.1 Explanatory variables

For the second stage of DEA, we used a set of explanatory variables besides PSM and its dimensions (I.e., APS, SS, CPV) to explore its influence on organizational performance, defined by efficacy scores in the Jordanian public hospitals. However, we used the following variables as demonstrated in Table 3-82:

**Table 3-82: Second stage DEA listed variables**

<b>Variable</b>	<b>Definition</b>	<b>Measurement</b>
<b>RETB</b>	The ratio of employees to the number of beds in the hospitals of the Ministry of Health	Number of employees/ beds numbers
<b>OPIPR</b>	Outpatient to inpatient ratio	Total outpatient's visits / total inpatients days
<b>ALOS</b>	Average length of stay	Total inpatients days / number of admissions
<b>HSIZE</b>	Hospital size (dummy variable)	(1) For large hospitals > 130 beds, (0) otherwise
<b>BOR</b>	Bed occupancy rate	Bed occupancy rate in a year = Inpatients days/ number of beds
<b>ADHR</b>	The ratio of administrative staff to health employees	The total number of FTEs / total number of FTEs doctors
<b>Territories</b>	The three main territories of Jordan: The Northern Government includes four governorates: Irbid, Ajloun, Jerash, and Ma'raq. It includes 16 sub governments and 14 districts. The Central Government has four governorates: the capital, Zarqa, al-Balqa, and Madaba. It includes 19 sub governments and 15 districts. The southern Government has four governorates: Karak, Ma'an, Tafileh, and Aqaba. It includes 16 sub governments and 9 districts.	(1) Northern Government, (2) Central Government, (3) Southern Government

Variable	Definition	Measurement
<b>COVID-19</b>	Coronavirus 2019 (COVID-19), also known as SARS-CoV-2 (dummy variable)	(1) for 2020 sample observation, and (0) otherwise
<b>EDUC</b>	The public hospitals that recognized as an educational hospital at the same time (dummy variable)	(1) for educational hospitals, and (0) otherwise
<b>Urban-Rural</b>	The area where the hospital/s operate	(1) if hospital in the observation operate in an urban area, (0) rural
<b>REFP*</b>	The proportion of refugees living in the gouvernante	The percentage of refugees living in campus and urban area of all the population in the gouvernante where the hospital/s operate.
<b>DN</b>	Death numbers	It refers to the <i>Hospital Mortality</i> rate implies the percentage of patients who die while in the hospital.
<b>SRGN</b>	General surgeries numbers	is the surgery that requires total anesthesia of the patient or the use of alternative devices for the lungs to ensure the safety of the breathing process, including operations that threaten the patient's life, such as those that include the cranium (skull), chest, heart, and pelvic cavity.
<b>JCIAO</b>	Joint Commission International Accreditation Organizations	(1) for hospitals have this accreditation, and (0) otherwise
<b>TECH</b>	represent the hospitals that have a smart infrastructure system	(1) for hospitals to have smart systems, and (0) otherwise

*Note:* the sign (/) equal (÷); \* Refugees from [Syria, Iraq, Somalia, Yemen, Sudan, Libya, Lebanon, Ethiopia, Russian (Circassians)]

The next table (Table 3-83) shows the descriptive analysis for the non-dummy variables that had been included in this study, such as, mean, SD, minimum and maximum value.

**Table 3-83: Second stage DEA explanatory factors descriptive analysis**

	OPIPR	RETB	ALOS	BOR	REFP	ADHR	SRGN	DN
<b>Mean</b>	12.777	4.032	2.633	77.892	88.499	5.415	2973.099	265.889
<b>Std. Deviation</b>	13.001	1.053	0.641	25.695	82.754	1.439	5034.639	455.036
<b>Minimum</b>	1.874	2.253	1.554	17.120	6.528	2.612	36.000	1.000
<b>Maximum</b>	80.007	7.359	4.288	163.209	274.078	8.758	30482.000	2491.000
<b>Valid</b>	81	81	81	81	81	81	81	81
<b>Missing</b>	0	0	0	0	0	0	0	0

### 3.2.3.2 Separability Condition “independence assumption”

Separability condition has a long debate arose on 2-stage DEA between [Simar & Wilson \(2007\)](#) and [Banker & Natarajan \(2008\)](#). The former paper was continued by [Simar & Wilson \(2011\)](#) and [Daraio, Simar & Wilson \(2018\)](#), whereas the latter was continued by [Banker \*et al.\* \(2019\)](#). In the last one, Banker *et al.* criticize the demanding notion of “separability condition” adopted by Simar & Wilson (indeed, Banker didn’t traditionally use the term “separability condition” but that of “independence assumption”). Moreover, they seem to understand independence as zero bivariate correlation, although they don’t define a specific kind of correlation coefficient (Pearson, Spearman...). They conclude that a DEA+OLS approach is appropriate not only with zero correlation but also with moderate correlation (concreted as 0,3, but this is only a value chosen for their simulations, not an insurmountable threshold). Following [Banker and Natarajan’s \(2008\)](#) approach for the second stage of DEA estimation for the contextual variables is statistically consistent under certain assumptions and regularity conditions, with a threshold of (-0.2) to (+0.4). However, the next table (Table 3-84) shows that inputs nor outputs exceed the interval of Banker and Natarajan.



**Table 3-83: Spearman correlation matrix for separability condition between DEA indicators and PSM dimensions**

<b>Inputs</b>							
<b>Variable</b>	<b>(I)BN</b>	<b>(I)HCN</b>	<b>(I) NP</b>	<b>(I)SMP</b>	<b>APS</b>	<b>SS</b>	<b>CPV</b>
1. (I)BN	—						
2. (I)HCN	0.805	—					
3. (I) NP	0.839	0.836	—				
4. (I)SMP	0.813	0.889	0.818	—			
5. APS	- 0.006	0.035	0.118	0.035	—		
6. SS	- 0.008	0.034	0.116	0.034	0.997	—	
7. CPV	0.013	0.051	0.127	0.053	0.991	0.992	—
<b>Outputs</b>							
	<b>(O) OV</b>	<b>(O) PD</b>	<b>(O) EMA</b>	<b>(O) NIE</b>	<b>APS</b>	<b>SS</b>	<b>CPV</b>
1. (O) OV	—						
2. (O) PD	0.563	—					
3. (O) EMA	0.661	0.613	—				
4. (O) NIE	0.593	0.752	0.654	—			
5. APS	-0.093	-0.072	0.082	-0.091	—		
6. SS	-0.102	-0.075	0.084	-0.093	0.997	—	
7. CPV	-0.088	-0.054	0.101	-0.072	0.991	0.992	—



In the following table (Table 3-84) we perform a Spearman correlation between all the DEA indicators (i.e., Input and Output indicators) and our explanatory variables.

Firstly, the relationships between the input and output have already been illustrated and discussed in the table (3-80). Secondly, in the correlation test for the variables of the second-stage DEA we used a set of explanatory variables besides PSM and its dimensions. The results indicate that the variable OPIPR shows a significant and negative correlation with all the DEA indicators, unless the variable OV. However, the strongest correlation was with two output indicators (i.e., PD and NIE). Also, it was found to be negatively correlated with other explanatory variables (i.e., ALSO, BOR, SRGN, DN).

Following, the variable RETB, it found to be negatively correlated with all our DEA indicators. In addition, it was also negatively correlated with other explanatory variables (i.e., ALOS, BOR, SRGN, DN). In line with the previous results, ADHR was found to be also negatively and significantly correlated with all the DEA indicators. Moreover, the results indicate that ADHR is also negatively correlated with SRGN, DN, and DN/PD.

On the other hand, REFP was found to be nonsignificant with all the DEA indicators. It was only found to be significantly and negatively correlated with the explanatory variables RETB, and BOR. The variable SRGN was found to be statistically and positively correlated with DEA indicators. However, the correlations were strong and ranged between ( $r=0.7$  to  $0.8$ ). But on the other side, it was negatively associated with three explanatory variables (OPIPR, RETB, and ADHR), where it was significant only for the last two variables. On the same line, DN was also found to be statistically and positively correlated with DEA indicators, with strong associations ranging from  $r=(0.73)$  to  $r=(0.87)$ . Similarly, to the variable SRGN, the variable DN was found to be negatively correlated with OPIPR, RETB, and ADHR.

Additionally, the DN/NIE was positively correlated with all the DEA indicators, and it was only found to be negatively correlated with RETB and ADHR. Also, the variable DN/PD was positively correlated with all the DEA indicators, unless PD. More, it was negatively correlated with ALSO, REFP, and ADHR.

**Table 3-84: Spearman correlation matrix between DEA indicators and explanatory variables**

Correlation Probability	(I)BN	(I)HCN	(I)NOP	(I)SMP	(O)OV	(O)PD	(O)EME	(O)NIE	OPIPR	RETB	ALOS	BOR	REFP	ADHR	SRGN	DN	DN/NIE	DN/PD	
(I)BN	1.00																		
(I)HCN	0.805	1.00																	
	0.000	-----																	
(I)NoP	0.839	0.836	1.00																
	0.000	0.000	-----																
(I)SMP	0.813	0.889	0.818	1.00															
	0.000	0.000	0.000	-----															
(O)OV	0.659	0.731	0.733	0.732	1.00														
	0.000	0.000	0.000	0.000	-----														
(O)PD	0.919	0.856	0.811	0.850	0.563	1.00													
	0.000	0.000	0.000	0.000	0.000	-----													
(O)EME	0.791	0.788	0.806	0.780	0.661	0.613	1.00												
	0.000	0.000	0.000	0.000	0.000	0.000	-----												
(O)NIE	0.917	0.878	0.858	0.858	0.593	0.752	0.654	1.00											
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-----											
OPIPR	-0.466	-0.360	-0.325	-0.341	0.196	-0.538	-0.221	-0.549	1.00										
	0.000	0.000	0.003	0.001	0.078	0.000	0.046	0.000	-----										
RETB	-0.478	-0.163	-0.170	-0.189	-0.099	-0.461	-0.317	-0.395	0.4798	1.00									
	0.000	0.144	0.128	0.089	0.377	0.000	0.003	0.000	0.000	-----									
ALOS	0.295	0.242	0.176	0.263	0.242	0.445	0.168	0.191	-0.020	-0.318	1.00								
	0.007	0.028	0.122	0.017	0.026	0.000	0.131	0.087	0.855	0.003	-----								
BOR	0.438	0.508	0.503	0.472	0.282	0.581	0.475	0.698	-0.484	0.021	-0.159	1.000							
	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.848	0.155	-----							
REFP	0.039	-0.070	-0.034	-0.093	0.070	0.096	0.126	0.107	0.022	-0.379	0.1487	-0.026	1.00						
	0.726	0.529	0.757	0.404	0.532	0.392	0.259	0.338	0.842	0.000	0.184	0.812	-----						
ADHR	-0.502	-0.477	-0.621	-0.483	-0.411	-0.447	-0.445	-0.478	0.052	0.163	-0.039	-0.095	-0.159	1.00					
	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.639	0.145	0.729	0.394	0.155	-----				
SRGN	0.803	0.750	0.736	0.748	0.751	0.690	0.716	0.759	-0.172	-0.345	0.107	0.365	0.076	-0.434	1.00				
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.001	0.340	0.000	0.499	0.000	-----				
DN	0.831	0.875	0.867	0.861	0.747	0.735	0.856	0.794	-0.241	-0.224	0.172	0.431	0.048	-0.460	0.743	1.00			
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.043	0.123	0.000	0.670	0.000	0.000	-----			
DN/ NIE	0.413	0.517	0.525	0.511	0.573	0.277	0.570	0.310	0.122	-0.003	0.193	0.006	0.031	-0.287	0.435	0.787	1.00		
	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.004	0.276	0.976	0.083	0.951	0.781	0.009	0.000	0.000	-----		
DN/PD	0.325	0.414	0.443	0.406	0.425	0.108	0.481	0.232	0.058	0.065	-0.186	0.055	-0.054	-0.230	0.392	0.702	0.904	1.00	
	0.003	0.000	0.000	0.000	0.000	0.333	0.000	0.036	0.601	0.563	0.096	0.623	0.628	0.038	0.000	0.000	0.000	-----	

Source: Owen production using Eviews software

## **CHAPTER IV: DATA ANALYSIS AND PRESENTING RESULTS**

### **Prologue**

In this chapter, the researcher will present the results of data analysis to answer the study questions, test research hypotheses, and draw conclusions. However, this chapter is split into two parts, firstly is the part concerning: (1) finding the level of PSM and ethical behaviours in the Jordanian public hospitals, (2) estimating the influence of PSM on ethical behaviour in Jordanian public hospitals by testing the study hypothesis to fulfil the aims of this study. On the other hand, the second part of this chapter presents the results of the influence of PSM on organizational performance defined by efficiency, using Two-Stage DEA in the Jordanian public hospitals.

## 4.1 PSM AND ETHICAL BEHAVIOUR

### 4.1.1 The Level of PSM In the Jordanian Public Hospitals

To answer the first study question; means and standard deviations of the PSM of Jordanian hospital employees and its dimensions (commitment to public values, self-sacrifice, and attraction to public service) in hospitals, followed by a t-test for each of them compared to the arithmetic mean of the applicable middle gradient of Likert scale in the current study; to decide the level of their PSM it in hospitals from in light of rejecting or accepting the null hypothesis of (t) test, which states: “*The mean of PSM and its dimensions for the Jordanian public hospital’s employees does not differ from the theoretical arithmetic mean of Likert’s scale of Its value is (3), at the alpha level ( $\alpha = 0.05$ )*”, as shown in Table 4-1.

**Table 4-1: The results of the univariate and t-test of the PSM of Jordanian hospital employees and its dimensions**

Rank <sup>+</sup>	Dimension ID	PSM and Dimensions	Mean	STD	t	Level <sup>&amp;</sup>
	<i>Commitment to Public Values</i>					
1	3		3.02	0.94	0.51	Moderate
	<i>Self-Sacrifice</i>					
2	2		2.73	0.98	-6.54*	Low
	<i>Attraction to Public Service</i>					
3	1		2.33	0.91	-17.70*	Low
	<b>Whole Scale</b>					
			2.73	0.75	-8.76*	Low

<sup>+</sup> The order of PSM dimensions was considered according to the values of the one sample t-test, in descending order.

<sup>&</sup> The process of classifying the levels of PSM and its dimensions according to the significance level of the one-sample t-test according to the criterion contained in the method.

\*  $p \leq 0.05$

It is noticed from Table 4-1 that the level of PSM among the Jordanian public hospital’s employees is within the (low) level, because its arithmetic mean was smaller than the arithmetic means of the (Moderate) grading with a statistically significant difference ( $\alpha = 0.05$ ). While the order of the PSM dimensions in the Jordanian hospitals is as follows: CPV came in the first place within the (Moderate) level,

because its mean was greater than the mean of the middle grading with a statistically non-significant difference ( $\alpha = 0.05$ ). Then the SS came in the second place within the (low) level, because its arithmetic mean was smaller than the mean of the middle grading with a statistically significant difference ( $\alpha = 0.05$ ). Afterwards, APS ranked third within the (low) level, because its mean was smaller than the means of the middle grading.

The means and standard deviations of the items of CPV were calculated, followed by a t-test for each of them compared to the arithmetic mean of the Likert scale (Middle) applied in the current study; to decide the level of their CPV items in hospitals in light of rejecting or accepting the null hypothesis (t) test, which states: "*The mean of CPV items for the Jordanian public hospital's employees does not differ from the theoretical arithmetic mean of Likert's scale of Its value is (3), at the alpha level ( $\alpha = 0.05$ )*", as shown in Table 4-2.

**Table 4-2: The results of the univariate and t-test of the CPV items in Jordanian public hospitals**

Rank +	Item ID	Context of Items for CPV dimension	Mean	STD	t	Level &
		<i>I believe that it is important that public employees account for all the costs/expenses they make</i>				
1	1		3.27	1.16	5.61*	High
		<i>To me, serving public interests is more important than helping other people</i>				
2	2		3.21	1.15	4.42*	High
		<i>I think that what is really matters in this work is expertise, not ethics</i>				
3	4		2.87	1.12	-2.73*	Low
		<i>My mission is not asking about activities legitimacy but simply do the job</i>				
4	3		2.72	1.19	-5.55*	Low

<sup>+</sup> The order of the CPV items was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels of CPV items according to the significance level of the one-sample t-test according to the criterion contained in the method. \*  $p \leq 0.05$

It is noted from Table 4-2 that the CPV of hospital employees in Jordan public hospitals is within the level of:

1. High; for the two paragraphs (1 and 2), respectively, because their mean was greater than the mean of the middle grading with a statistically significant difference ( $\alpha = 0.05$ ).
2. low; for the two paragraphs (with two numbers: 4, then 3),

respectively; because their mean was smaller than the arithmetic means of the middle grading with a statistically significant difference ( $\alpha = 0.05$ ).

The means and standard deviations of the items of SS were calculated, followed by a t-test for each of them compared to the arithmetic mean of the middle gradient of the Likert scale that was applied in the current study; to decide the level of their SS items in hospitals in light of rejecting or accepting the null hypothesis (t) test, which states: “*The mean of SS items for the Jordanian public hospitals’ employees does not differ from the theoretical arithmetic mean of Likert’s scale of Its value is (3), at the alpha level ( $\alpha = 0.05$ )*”, as shown in Table 4-3.

**Table 4-3: The results of the univariate and t-test of the SS items in Jordanian public hospitals**

Rank <sup>+</sup>	Item ID	Context of Items for SS dimension	Mean	STD	t	Level <sup>&amp;</sup>
1	1	<i>I consider putting civic duty before myself is a vital role for public healthcare sector workers</i>	2.84	1.20	-3.25*	Low
2	4	<i>If my manager does not reward my commitment, I believe that there is no reason to make any extra effort</i>	2.74	1.09	-5.68*	Low
3	2	<i>Much of what I do is for a cause bigger than me as an employee in the hospital</i>	2.70	1.20	-5.86*	Low
4	3	<i>I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort</i>	2.65	1.20	-7.06*	Low

<sup>+</sup> The order of the SS items was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels of SS items according to the significance level of the one-sample t-test according to the criterion contained in the method; \*  $p \leq 0.05$ .

It is noticed from Table 4-3 that the items of SS in Jordanian public hospitals are within a (low) level for all paragraphs (with numbers: 1, 4, 2, then 3), respectively, because its arithmetic mean was smaller than the arithmetic mean of the middle grading with a statistically significant difference ( $\alpha = 0.05$ ).

Then, the means and standard deviations of the items of APS were calculated, followed by a t-test for each of them compared to the

arithmetic mean of the Likert scale (Middle) applied in the current study; to decide the level of their APS items in hospitals in light of rejecting or accepting the null hypothesis (t) test, which states: “*The mean of the APS items of Jordanian public hospitals employees do not differ for the theoretical arithmetic mean of the five-point Likert scale, whose value is (3) at the alpha level ( $\alpha = 0.05$ )*”, as shown in Table 4-4.

**Table 4-4: The results of the univariate and t-test of the APS items in Jordanian public hospitals**

Rank <sup>+</sup>	Item ID	Context of Items for APS dimension	Mean	STD	t	Level &
		<i>Helping to improve the public service is one of the concerns that prevail among the hospital employees</i>				
1	1		2.49	1.04	11.63*	Low
		<i>I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community</i>				
2	2		2.28	1.19	14.54*	Low
		<i>I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector</i>				
3	4		2.21	1.08	17.40*	Low

<sup>+</sup> The order of the APS items was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels of APS items according to the significance level of the one-sample t-test according to the criterion contained in the method.

\*  $p \leq 0.05$

It is noticed from (Table 4-4) that the items of APS in Jordanian public hospitals are within a (low) level from their point of view for all paragraphs (with numbers: 1, 2, then 4), respectively, because their arithmetic mean was smaller than the arithmetic means of the middle scale by a difference Statistically significant ( $\alpha = 0.05$ ).

#### 4.1.2 The level of ethical behaviour in the Jordanian public hospitals

To answer the second study question; the arithmetic means and standard deviations of the ethical behaviour of hospital employees in Jordan and its dimensions (EBS, EBC, and ethical leadership) in



hospitals were calculated, followed by a t-test for each of them compared to the arithmetic mean of Likert scale (middle) used in the current study; to decide the level of their ethical behaviour in Jordanian public in light of rejecting or accepting the null hypothesis of (t) test, which states: “*The mean of ethical behaviour and its dimensions for the Jordanian public hospitals’ employees does not differ from the theoretical arithmetic mean of Likert’s scale of Its value is (3), at the alpha level ( $\alpha = 0.05$ )*”, as shown in (Table 4-5).

**Table 4-5: The results of the univariate and t-test of the ethical behaviour of Jordanian hospital employees and its dimensions**

Rank <sup>+</sup>	Dimension ID	Ethical Behaviour	Mean	STD	t	Level <sup>&amp;</sup>
<i>Ethical Behaviour of Co-workers</i>						
1	2		3.25	1.06	5.56*	High
<i>Ethical Behaviour of Self</i>						
2	1		2.93	0.92	-1.74	Moderate
<i>Ethical Leadership</i>						
3	3		2.82	0.92	-4.71*	Low
<b>Whole Scale</b>						
			2.97	0.72	-0.90	Moderate

<sup>+</sup> The order of the dimensions of ethical behaviour was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels of ethical behaviour and its dimensions according to the significance level of the one-sample t-test according to the criterion contained in the method.

\*  $p \leq 0.05$

It is noticed from Table 4-5 that the ethical behaviour of Jordanian hospital employees in hospitals is within the (Moderate) level, because its arithmetic mean was smaller than the arithmetic means of the middle grading of Likert scale with a statistically non-significant difference ( $\alpha = 0.05$ ). While the order of ethical behaviour dimensions was as follows: the EBC ranked first within the (high) level, because its arithmetic mean was greater than the arithmetic mean of the middle grading of Likert scale with a statistically significant difference ( $\alpha = 0.05$ ), then the EBS ranked second within the (Moderate) level, because its arithmetic mean was smaller than the arithmetic mean of the middle grading with a statistically non-significant difference ( $\alpha = 0.05$ ), then the ethical behaviour of leadership ranked third within the (low) level,

because the arithmetic mean was smaller than the mean arithmetic for the middle Likert scale grading with a statistically significant difference ( $\alpha = 0.05$ ).

The arithmetic means and standard deviations of the EBC items were calculated for hospital employees, followed by a t-test for each of them compared to the arithmetic mean of Likert scale (middle gradient) used in the current study; to decide the level of the EBC items for Jordanian public hospitals employees in light of rejecting or accepting the null hypothesis of t-test, which states: “*The mean of the EBC items of Jordanian public hospitals employees do not differ for the theoretical arithmetic mean of the five-point Likert scale, whose value is (3) at the alpha level ( $\alpha = 0.05$ )*”, as shown in (Table 4-6).

**Table 4-6: The results of the univariate and t-test of the ethical behaviour of co-workers of Jordanian hospital employees**

Rank <sup>+</sup>	Item ID	Context of Items for EBC Dimension	Mean	STD	t	Level &
1	5	<i>My co-workers believe that it is acceptable to make personal calls at work</i>	3.32	1.27	5.98*	High
2	4	<i>My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	3.22	1.28	4.03*	High
3	3	<i>My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	3.20	1.27	3.79*	High

<sup>+</sup> The order of the dimensions of EBC was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels of EBC according to the significance level of the one-sample t-test according to the criterion contained in the method.

\*  $p \leq 0.05$

It is noticed from (Table 4-6) that the EBC in hospitals is within a (high) level for all items (with numbers: 1, 2, then 4), respectively, because their arithmetic mean was greater than the arithmetic means of the middle scale of (3) with a statistically significant difference ( $\alpha = 0.05$ ).

The arithmetic means and standard deviations of the items of EBS in hospitals were calculated, followed by a t-test for each of them compared to the arithmetic mean of Likert scale (the mean) used in the current study; to decide on the level of the EBS items in hospitals from

taking into consideration of rejecting or accepting the null hypothesis of the t-test, which states: “*The mean of the EBS items of Jordanian public hospitals employees do not differ for the theoretical arithmetic mean of the five-point Likert scale, whose value is (3) at the alpha level ( $\alpha = 0.05$ ), as shown in (Table 3-7).*”

**Table 4-7: The results of the univariate and t-test of the ethical behaviour of self of Jordanian hospital employees**

Rank <sup>+</sup>	Item ID	Context of Items for EBS Dimension	Mean	STD	t	Level <sup>&amp;</sup>
1	4	<i>I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work</i>	3.04	1.12	0.83	Moderate
2	5	<i>I believe that it is acceptable to make personal calls at work</i>	2.95	1.21	-1.00	Moderate
3	1	<i>It is acceptable for me to take office supplies home</i>	2.94	1.22	-1.17	Moderate
4	2	<i>In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards</i>	2.91	1.17	-1.90	Moderate
5	3	<i>I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization</i>	2.83	1.10	-3.70*	Low

<sup>+</sup> The order of the dimensions of EBS was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels EBS according to the significance level of the one-sample t-test according to the criterion contained in the method.

\*  $p \leq 0.05$

It is noticed from (Table 4-7) that the EBS in hospitals comes within the level of:

1. Average; for items (numbered: 4, 5, 1, then 2), respectively; because its arithmetic means were greater/smaller than the arithmetic mean of the mean grading with a statistically non-significant difference ( $\alpha = 0.05$ ).

2. Low; for the paragraph (number: 3) in the last rank; for the reason that its arithmetic mean was smaller than the arithmetic means of the middle grading with a statistically significant difference ( $\alpha = 0.05$ ).

The arithmetic means and standard deviations of the ethical leadership items were calculated for hospital employees, followed by a t-test for each of them compared to the arithmetic mean of Likert scale (middle gradient) used in the current study; to decide the level of the ELS items for Jordanian public hospitals employees in light of rejecting



or accepting the null hypothesis of t-test, which states: “*The mean of the ethical leadership items of Jordanian public hospitals employees do not differ for the theoretical arithmetic mean of the five-point Likert scale, whose value is (3) at the alpha level ( $\alpha = 0.05$ )*”, as shown in (Table 4-8).

**Table 4-8: The results of the univariate and t-test of the ethical leadership of Jordanian hospital employees**

Rank <sup>+</sup>	Item ID	Context of Items for ELS	Mean	STD	t	Level <sup>&amp;</sup>
1	6	<i>My supervisor insists on doing what is fair and ethical even when it is not easy</i>	3.07	1.21	1.32	Moderate
2	5	<i>My supervisor holds employees accountable for using ethical practices in their work</i>	3.02	1.26	0.47	Moderate
3	7	<i>My supervisor opposes the use of unethical practices to increase performance</i>	2.69	1.25	-5.96*	Low
4	8	<i>My supervisor regards honesty and integrity as important personal values</i>	2.49	1.21	-9.93*	Low

<sup>+</sup> The order of the dimensions of ethical behaviour was considered according to the values of the t-test for one sample, in descending order.

<sup>&</sup> The process of classifying the levels ethical behaviour according to the significance level of the one-sample t-test according to the criterion contained in the method.

\*  $p \leq 0.05$

It is noticed from (Table 4-8) that the ethical behaviour of leadership in hospitals comes within the level of:

1. Average; for the two paragraphs (6, then 5) respectively; because their arithmetic mean was greater than the arithmetic means of the middle grading with a difference that was not statistically significant ( $\alpha = 0.05$ ).

2. Low; for the two paragraphs (7, then 8) respectively; Because their arithmetic mean was smaller than the arithmetic means of the middle grading with a statistically significant difference ( $\alpha = 0.05$ ).

#### 4.1.3 PSM and sociodemographic variables

In this part researcher will present the results related to the study question, which states: “Are there statistically significant differences ( $\alpha = 0.05$ ) between the arithmetic means of the PSM in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title?”.

The arithmetic means and standard deviations of the PSM and its dimensions (CPV, SS, and APS) in Jordanian public hospitals from their point of view according to gender, educational level, age, practical experience, administrative status, and job title, as shown in (Table 4-9).

**Table 4-9: Arithmetic means and standard deviations of PSM and its dimensions according to the sociodemographic variables**

IVs, Levels & Statistic	Public Service Motivation			Whole Scale
	Attraction to Public Service	Self-Sacrifice	Commitment to Public Values	
<i>Gender</i>				
<i>Male</i>				
Mean (STD)	2.25 (0.93)	2.65 (0.98)	2.99 (0.94)	2.67 (0.74)
<i>Female</i>				
Mean (STD)	2.40 (0.88)	2.81 (0.98)	3.05 (0.94)	2.78 (0.75)
<i>Educational Level</i>				
<i>Bachelor's Degree</i>				
Mean (STD)	2.42 (0.93)	2.70 (0.97)	2.95 (0.94)	2.71 (0.75)
<i>Master's Degree</i>				
Mean (STD)	2.24 (0.83)	2.76 (0.96)	3.10 (0.88)	2.75 (0.70)
<i>Doctorate Degree</i>				
Mean (STD)	2.16 (0.95)	2.79 (1.05)	3.09 (1.06)	2.73 (0.83)
<i>Age</i>				
<i>Less than 25</i>				
Mean (STD)	2.57 (0.87)	2.79 (0.86)	2.97 (0.82)	2.79 (0.57)
<i>at 25 to 35</i>				
Mean (STD)	2.30 (0.86)	2.64 (0.92)	2.97 (0.97)	2.67 (0.71)
<i>at 36 to 45</i>				
Mean (STD)	2.33 (0.96)	2.84 (0.99)	3.07 (0.89)	2.78 (0.73)
<i>at 46 to 55</i>				
Mean (STD)	2.25 (0.88)	2.67 (1.05)	3.04 (0.98)	2.69 (0.85)
<i>at 56 and above</i>				
Mean (STD)	2.34 (0.90)	2.72 (1.01)	3.02 (1.02)	2.73 (0.79)
<i>Practical experience</i>				
<i>5 years or less</i>				
Mean (STD)	2.63 (0.85)	2.77 (0.89)	2.92 (0.91)	2.79 (0.63)
<i>at 6 to 11 years</i>				
Mean (STD)	2.31 (0.92)	2.66 (0.93)	2.97 (0.92)	2.67 (0.70)
<i>at 12 to 16 years</i>				
Mean (STD)	2.19 (0.87)	2.73 (0.99)	3.06 (0.95)	2.70 (0.74)
<i>at 17 years and above</i>				
Mean (STD)	2.34 (0.93)	2.76 (1.05)	3.06 (0.96)	2.76 (0.82)
<i>Administrative Status</i>				
<i>Yes</i>				
Mean (STD)	2.50 (0.96)	2.90 (1.02)	3.04 (0.93)	2.84 (0.77)
<i>No</i>				
Mean (STD)	2.24 (0.87)	2.65 (0.95)	3.01 (0.95)	2.67 (0.73)
<i>Job Title</i>				
<i>Doctors</i>				
Mean (STD)	2.00 (0.84)	2.47 (0.90)	2.91 (0.93)	2.50 (0.68)
<i>Registered Nurse</i>				

IVs, Levels & Statistic	Public Service Motivation			Whole Scale
	Attraction to Public Service	Self-Sacrifice	Commitment to Public Values	
Mean (STD)	2.30 (0.89)	2.59 (0.86)	2.89 (0.90)	2.62 (0.73)
<i>Administrative</i>				
Mean (STD)	2.41 (0.90)	2.75 (0.98)	2.95 (0.98)	2.73 (0.74)
<i>Director of the (Department/Service)</i>				
Mean (STD)	2.50 (0.96)	2.91 (1.03)	3.07 (0.94)	2.86 (0.78)
<i>Pharmacists</i>				
Mean (STD)	2.19 (0.71)	2.66 (1.00)	3.18 (0.99)	2.72 (0.72)
<i>Other (Public Health technician/Radiology Technician/Tailors/Chefs)</i>				
Mean (STD)	2.18 (0.88)	2.73 (0.96)	3.22 (0.85)	2.76 (0.73)

It is noted in (Table 4-9) that there are significant differences between the arithmetic means of PSM in Jordanian public hospitals, resulting from the different levels of variables. To verify the significance of the apparent differences; 6-way ANOVA was conducted -without interaction- between the arithmetic means for their PSM according to the studied variables; in order to test the null hypotheses, which stated: “*There are no statistically significant differences between the arithmetic means of the PSM in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title at the alpha level ( $\alpha = 0.05$ )*”, as shown in (Table 4-10).

Table 4-10: The results of 6-way ANOVA -without interaction- between the arithmetic means of employees’ PSM according to the sociodemographic variables

Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
<i>Gender</i>	1.96	1	1.96	3.58	0.06
<i>Educational Level</i>	1.42	2	0.71	1.30	0.27
<i>Age</i>	2.09	4	0.52	0.95	0.43
<i>Practical Experience</i>	0.64	3	0.21	0.39	0.76
<i>Administrative Status</i>	0.01	1	0.01	0.02	0.90
<i>Job Title</i>	4.32	5	0.86	1.58	0.16
<i>Error</i>	301.13	550	0.55		
<i>Total</i>	314.46	566			

Table (4-10) shows that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means of the PSM in the Jordanian public hospitals, due to gender. According to the acceptance of the null hypothesis of the gender of the study members, which states that “*There is no statistically significant difference at the significance level ( $\alpha = 0.05$ ) between the two arithmetic means of PSM yielded to gender.*” It also, shows that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means of the PSM in the Jordanian public hospitals, yielded to gender. Regarding the acceptance of the null hypothesis of the educational level of the study members, which states that “*There is no statistically significant difference at the significance level ( $\alpha = 0.05$ ) between the two arithmetic means of PSM yielded to educational level.*”

It appears that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means of the PSM in the Jordanian public hospitals, yielded to practical experience. Based on the acceptance of the null hypothesis of the practical experience of the study members, which states that “*There is no statistically significant difference at the significance level ( $\alpha = 0.05$ ) between the two arithmetic means of PSM yielded to practical experience.*”

It shows that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means of the PSM in the Jordanian public hospitals, yielded to practical experience. Based on the acceptance of the null hypothesis of the practical experience of the study members, which states that “*There is no statistically significant difference at the significance level ( $\alpha = 0.05$ ) between the two arithmetic means of PSM yielded to practical experience.*”. Furthermore, it could be noticed from the previous table that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means of the PSM in the Jordanian public hospitals, yielded to administrative status. Also, based on the acceptance of the null hypothesis of the administrative status of the study members, which states that “*There is no statistically significant difference at the significance level ( $\alpha = 0.05$ ) between the two arithmetic means of PSM yielded to administrative status.*”

As can be seen from (Table 4-10) that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means of the PSM in the Jordanian public hospitals, yielded to the job title. Based on the acceptance of the null hypothesis of the job title of the study members, which states that “*There is no statistically significant difference at the significance level ( $\alpha = 0.05$ ) between the two arithmetic means of PSM yielded the to the job title.*”.

It is also noted from Table 4-10 that there are apparent significant differences between the arithmetic means of the PSM and its dimensions (APS, SS, CPC) resulting from the different levels of variables. However, to verify the significance of the differences; the Bartlett test for sphericity was required; in order to verify the reliability of the values of the inter-correlation coefficients for the PSM dimensions in Jordanian public hospitals yielded to the sociodemographic variables; to determine the most appropriate analysis of variance to be used (6-way ANOVA - without interaction- in our case), as shown in (Table 4-11).

**Table 4-11: The results of Bartlett test for sphericity for the values of the inter-correlation coefficients for the dimensions of PSM in the Jordanian public hospitals according to the sociodemographic variables**

Correlation due to IVs	Attraction to Public Service (APS)	Self-Sacrifice (SS)
Self-Sacrifice (SS)	0.48*	
Commitment to Public Values (CPV)	0.18	0.57*
Bartlett's Test of Sphericity		
Approx. $\chi^2$	df	Sig.
370.35*	5	0.00

\*  $p \leq 0.05$

It is clear from (Table 4-11) that there is a statistically significant correlation ( $\alpha = 0.05$ ) between the dimensions of PSM in the Jordanian public hospitals, which are attributed to gender, educational level, age, practical experience, administrative status, and job title. This led to the obligatory conduct of the 6-way ANOVA -without interaction- between the arithmetic means for the dimensions of PSM in the Jordanian public



hospitals according to the sociodemographic variables. Nevertheless, in order to test the null hypotheses, which stated: “*There Are no statistically significant differences between the arithmetic means of the PSM in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title at the alpha level ( $\alpha = 0.05$ )*”, as shown in (Table 4-12).

**Table 4-12: The results of 6-way ANOVA -without interaction- between the arithmetic means of the employees’ PSM according to the sociodemographic variables**

Effect	6-way MANOVA		Whole F	df of:		Sig.
	Type	Value		Hypothesis	Error	
<b>Gender</b>						
	Hotelling's Trace	0.01	1.27	3	548	0.28
<b>Educational Level</b>						
	Wilks' Lambda	0.98	1.83	6	1096	0.09
<b>Age</b>						
	Wilks' Lambda	0.98	0.92	12	1450.16	0.52
<b>Practical Experience</b>						
	Wilks' Lambda	0.98	0.95	9	1333.84	0.48
<b>Administrative Status</b>						
	Hotelling's Trace	0.01	1.06	3	548	0.37
<b>Job Title</b>						
	Wilks' Lambda	0.96	1.40	15	1513.19	0.14

Table (4-12) shows that there is no statistically significant effect at the alpha level ( $\alpha = 0.05$ ) for each of (gender, educational level, age, practical experience, administrative status, and job) in the means of the PSM dimensions combined in Jordanian public hospitals. This indicates the acceptance of all the null hypotheses that stated: “*There Are no statistically significant differences between the arithmetic means of the PSM in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title at the alpha level ( $\alpha = 0.05$ )*”.

#### 4.1.4 Ethical behaviour and sociodemographic variables

In this part researcher will present the results related to the study question, which states: “*Are there statistically significant differences ( $\alpha = 0.05$ ) between the arithmetic means of the ethical behaviour in the*

Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title? ”.

The arithmetic means and standard deviations of the *ethical behaviour* and its dimensions (EBS, EBC, and ELS) in Jordanian public hospitals from their point of view according to gender, educational level, age, practical experience, administrative status, and job title, as shown in the next table (Table 4-13).

**Table 4-13: Arithmetic means and standard deviations of ethical behaviour and its dimensions according to the sociodemographic variables**

IVs, Levels & Statistic	Ethical Behaviour			Whole Scale
	Ethical Behaviour of Self	Ethical Behaviour of Co-workers	Ethical Leadership	
<b>Gender</b>				
<i>Male</i>				
Mean (STD)	2.87 (0.92)	3.21 (1.06)	2.78 (0.92)	2.93 (0.73)
<i>Female</i>				
Mean (STD)	3.00 (0.92)	3.28 (1.05)	2.85 (0.92)	3.02 (0.70)
<b>Educational Level</b>				
<i>Bachelor's Degree</i>				
Mean (STD)	2.89 (0.93)	3.15 (1.06)	2.74 (0.91)	2.90 (0.70)
<i>Master's Degree</i>				
Mean (STD)	2.96 (0.89)	3.35 (1.01)	2.86 (0.88)	3.02 (0.71)
<i>Doctorate Degree</i>				
Mean (STD)	3.05 (0.98)	3.39 (1.10)	3.02 (1.02)	3.13 (0.79)
<b>Age</b>				
<i>Less than 25</i>				
Mean (STD)	2.95 (0.83)	3.16 (1.02)	2.87 (0.98)	2.98 (0.60)
<i>at 25 to 35</i>				
Mean (STD)	2.99 (0.91)	2316 (1.06)	2.75 (0.91)	2.95 (0.70)
<i>at 36 to 45</i>				
Mean (STD)	2.95 (0.96)	3.25 (1.06)	2.83 (0.91)	2.98 (0.73)
<i>at 46 to 55</i>				
Mean (STD)	2.87 (0.94)	3.33 (1.05)	2.86 (0.93)	2.98 (0.72)
<i>at 56 and above</i>				
Mean (STD)	2.83 (0.89)	3.37 (1.07)	2.88 (0.95)	2.98 (0.80)
<b>Practical Experience</b>				
<i>5 years or less</i>				
Mean (STD)	3.00 (0.90)	2.85 (1.02)	2.73 (0.81)	2.87 (0.58)
<i>at 6 to 11 years</i>				
Mean (STD)	2.93 (0.91)	3.22 (1.11)	2.79 (0.92)	2.95 (0.71)
<i>at 12 to 16 years</i>				
Mean (STD)	2.94 (0.93)	3.34 (0.99)	2.81 (0.98)	3.00 (0.72)
<i>at 17 years and above</i>				
Mean (STD)	2.89 (0.94)	3.35 (1.08)	2.89 (0.91)	3.00 (0.77)
<b>Administrative Statues</b>				
<i>Yes</i>				
Mean (STD)	2.95 (1.01)	3.25 (1.10)	2.84 (0.96)	2.98 (0.75)
<i>No</i>				

IVs, Levels & Statistic	Ethical Behaviour			Whole Scale
	Ethical Behaviour of Self	Ethical Behaviour of Co-workers	Ethical Leadership	
Mean (STD)	2.93 (0.88)	3.25 (1.03)	2.81 (0.90)	2.97 (0.70)
<b>Job Title</b>				
<b>Doctors</b>				
Mean (STD)	2.79 (0.84)	3.30 (0.99)	2.73 (0.86)	2.90 (0.67)
<b>Registered Nurse</b>				
Mean (STD)	2.79 (0.87)	3.22 (1.08)	2.84 (0.97)	2.91 (0.75)
<b>Administrative</b>				
Mean (STD)	2.95 (0.93)	3.08 (1.12)	2.73 (0.84)	2.91 (0.67)
<b>Director of the (Department/Service)</b>				
Mean (STD)	2.96 (1.01)	3.26 (1.11)	2.86 (0.97)	3.00 (0.77)
<b>Pharmacists</b>				
Mean (STD)	3.03 (0.86)	3.40 (1.04)	3.04 (0.84)	3.13 (0.71)
<b>Other (Public Health technician/Radiology Technician/Tailors/Chefs)</b>				
Mean (STD)	3.11 (0.83)	3.45 (0.78)	2.86 (1.02)	3.11 (0.68)

It is noted from (Table 4-13) that there are significant differences between the arithmetic means of ethical behaviour in Jordanian public hospitals, resulting from the different levels of variables. To confirm the significance of the apparent differences; 6-way ANOVA was conducted between the arithmetic means for their PSM according to the studied variables; in order to test the null hypotheses, which stated: “*There Are no statistically significant differences between the arithmetic means of the ethical behaviour in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title at the alpha level ( $\alpha = 0.05$ )*”, as shown in (Table 4-14).

**Table 4-14: The results of 6-way ANOVA -without interaction- between the arithmetic means of ethical behaviour according to the sociodemographic**

Variables					
Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
<i>Gender</i>	2.76	1	2.76	5.41*	0.02
<i>Educational Level</i>	3.81	2	1.91	3.74*	0.02
<i>Age</i>	0.75	4	0.19	0.37	0.83
<i>Practical Experience</i>	0.67	3	0.22	0.44	0.73
<i>Administrative Status</i>	0.19	1	0.19	0.38	0.54
<i>Job Title</i>	3.93	5	0.79	1.54	0.18
<i>Total</i>	291.25	566			

\*  $p \leq 0.05$

It is evident from Table 4-14 that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the two arithmetic means for the ethical behaviour of public hospitals employees in Jordan, yielded to gender. Where the females exalt the ethical behaviour of the employees of Jordan's public hospitals more than their male colleagues did. Hence, the researcher rejects the null hypothesis, which states that “*there is no statistically significant difference at the level of significance ( $\alpha = 0.05$ ) between the two arithmetic means of the ethical behaviour of Jordanian public hospitals employees, yielded to gender.*”

Table 4-14 shows that there are statistically significant differences at the alpha level ( $\alpha = 0.05$ ) between the arithmetic means for the ethical behaviour of Jordanian public hospitals employees that are attributed to the educational level. In order to determine the type of dimensional comparison test to be used; and since the educational level is multilevel, *Levin's test* was conducted according to the ( $F$ ) probability distribution to verify the equivalence of the sample variance between the arithmetic means of their ethical behaviour according to gender, educational level, age, practical experience, administrative status and job title, where its calculated value was (1.01) without significance statistically ( $\alpha = 0.05$ ) at (262) degrees of freedom for the numerator and (304) degrees of

freedom for the denominator; which indicates that the equivalence of the variance errors is verified. This result necessitated the use of one of the dimensional comparisons tests that take into account the equivalence of variance errors, represented by the *Scheffe* method for multiple dimensional comparisons. In order to determine which of the arithmetic mean differences for their ethical behaviour in hospitals differed in statistical significance ( $\alpha = 0.05$ ) at different levels of the variable educational level, as shown in Table 4-15.

**Table 4-15: The results of the (Scheffe) test for multiple dimensional comparisons between arithmetic means of the ethical behaviour of hospital employees in Jordanian public hospitals according to the educational level**

<b>Educational Level</b>		<b>Bachelor's Degree</b>	<b>Master's Degree</b>
<i>{Scheffe}</i>	Mean	2.90	3.02
Master's Degree	3.02	0.12	
Doctorate Degree	3.13	<b>0.22*</b>	0.10

\*  $p \leq 0.05$

It is clear from Table 4-16 that there is a statistically significant correlation ( $\alpha = 0.05$ ) between the dimensions of ethical behaviour of Jordanian public hospitals employees, yielded to gender, educational level, age, practical experience, administrative status, and job title. This led to the necessity to conduct of the 6-way ANOVA -without interaction- between the arithmetic means for the combined ethical behaviour dimensions according to the sociodemographic variables. Where, in order to test the null hypotheses, which stated: *There Are no statistically significant differences between the arithmetic means of the ethical behaviour in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title at the alpha level ( $\alpha = 0.05$ )*”, as shown in Table 4-17.

**Table 4-17: The results of 6-way ANOVA -without interaction- between the arithmetic means of the for their ethical behaviour according to the sociodemographic variables**

Effect	6-way MANOVA		F	df of:		Sig.
	Type	Value		Hypothesis	Error	
<i>Gender</i>	Hotelling's Trace	0.01	1.82	3	548	0.14
<i>Educational Level</i>	Wilks' Lambda	0.98	1.58	6	1096	0.15
<i>Age</i>	Wilks' Lambda	0.99	0.54	12	1450.16	0.89
<i>Practical Experience</i>	Wilks' Lambda	0.97	1.62	9	1333.84	0.11
<i>Administrative Status</i>	Hotelling's Trace	0.00	0.26	3	548	0.85
<i>Job Title</i>	Wilks' Lambda	0.97	1.18	15	1513.19	0.28

It is evident from Table 4-17 that there is no statistically significant effect ( $\alpha = 0.05$ ) for each of (gender, educational level, age, practical experience, administrative status, and job title) in the combined ethical behaviour dimensions in the Jordanian public hospitals. This indicates the acceptance of all the null hypotheses, which stated: “*There are no statistically significant differences between the arithmetic means of the ethical behaviour and its dimensions in the Jordanian public hospitals that are attributed to: gender, educational level, age, practical experience, administrative status, and job title at the alpha level ( $\alpha = 0.05$ )*”.

#### **4.1.4 The influence of PSM on ethical behaviour**

In this part, we used SEM analysis to test the hypothesized model of the influence of PSM on the Jordanian public hospital’s employees’ ethical behaviour, at three different levels [level one (PSM and Ethical Behavior); Level Two (PSM dimensions and Ethical Behavior); Level Three (PSM dimensions and Ethical Behavior dimensions)].

##### **4.1.4.1 Level one (PSM and ethical behaviour)**

To test the study first main hypotheses; we assess a general predictor model to predict the influence of PSM on ethical behaviour in Jordanian public hospitals, in order to be able to test its general null hypothesis, which states:

“H<sub>1,0</sub>: Public service motivation has a positive statistically significant influence on ethical behaviour in Jordanian public hospitals” as shown in Figure (4-1).

**Figure 4-1: The general SEM model of PSM in Jordanian public hospitals to predict ethical behaviour**



As a first step in the SEM model, the *Mahalanops* distance was calculated for all members of the study sample (567) employees of Jordanian public hospitals; to detect individuals who violate the possibility of matching the general predictive SEM model of the general population to the ability of the PSM of Jordanian hospitals’ staff to predict their ethical behaviour for its content data sufficiently, because they are far from its centre, as shown in Table 4-18.

**Table 18: The results of the Mahalanobis distance test for the distance of individuals from the data centre of the general predictor model data for the ability of the PSM of Jordanian hospital employees to predict their ethical behaviour.**

SN	Case ID	Mahalanobis $d^2$	$p_1$	$p_2$
1	46	6.43*	0.040	0.206
2	114	8.19*	0.017	0.474
3	135	6.77*	0.034	0.216
4	180	8.02*	0.018	0.456
5	181	9.16*	0.010	0.366
6	182	8.01*	0.018	0.342
7	185	6.59*	0.037	0.213
8	203	7.25*	0.027	0.258
9	258	10.64*	0.005	0.302
10	286	6.26*	0.044	0.218
11	313	8.97*	0.011	0.313
12	359	8.00*	0.018	0.244
13	365	6.60*	0.037	0.277
14	371	7.82*	0.020	0.250
15	383	14.23*	0.001	0.369
16	394	6.10*	0.047	0.289
17	397	7.01*	0.030	0.136
18	399	7.53*	0.023	0.171
19	404	7.76*	0.021	0.200
20	414	7.67*	0.022	0.170
21	421	10.62*	0.005	0.153
22	422	6.39*	0.041	0.181
23	423	11.54*	0.003	0.529
24	424	8.37*	0.015	0.495
25	425	7.02*	0.030	0.187
26	426	6.58*	0.037	0.165
27	434	7.11*	0.029	0.200
28	435	10.69*	0.005	0.509
29	440	7.23*	0.027	0.197
30	473	10.02*	0.007	0.181
31	493	6.01*	0.050	0.313

Note: \*  $p \leq 0.05$

It is clear from Table 4-18 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the calculated *Mahalanobis* distance values for (31) employees of hospitals staff from the data centre of the first SEM predictor model data for the ability PSM to predict ethical behaviour. This required dropping them from the data of the model in order to be able to reuse the SEM model, on the data of the remaining (536) employees.



As a second step in the CFA, the skewness and kurtoses indicators were calculated for the general predictor model that estimates the influence of PSM on ethical behaviour in Jordanian public hospitals; to reveal the violation of the assumption of a multivariate normal distribution of the responses of the study sample members to the two variables of the model, as shown in Table 4-19.

**Table 4-19: The results of the multivariate normality assessment using skewness and kurtoses indicators of the variables of the general predictor model that estimate the influence of PSM on ethical behaviour in Jordanian public hospitals**

Variable	Assessment of Normality					
	Range of Means		Skewness		Kurtosis	
	Min	Max	Statistic	CR	Statistic	CR
PSM	1	5	-0.013	0.130	-0.475	2.311*
EB	1.25	5	0.059	0.577	-0.172	-0.835
Multivariate					0.339	1.009

Note: \*  $p \leq 0.05$

It is clear from Table 4-19 that the absolute value of the skewness coefficient did not increase for any of the variables of the general predictor model that estimates the influence of PSM on ethical behaviour in Jordanian public hospitals from criterion (2), where its absolute values ranged between (0.013-0.059). Apparently, it is clear that the absolute value of the kurtosis's coefficient of any of the two variables of the model did not increase from criterion (7), where its absolute values ranged between (0.172-0.475, West, et al., 1995); which indicates that the assumption of a multivariate normal distribution of the responses of the study sample members to the two variables of the model was not violated.

And the (Bootstrap) method based on the MLE was applied using the parametric Monte Carlo method (Cheung & Lau, 2008) as a precautionary measure, despite not violating the assumption of a multivariate normal distribution of the responses of the study sample to the two model variables according to the Mardia's (1970) coefficient of multivariate kurtosis, which was not statistically significant ( $\alpha = 0.05$ ), it reached (1.009), by calculating the mean of the results of (200) random samples taken from the data of the original data (536); in order

to ensure the stability of the results of the SEM model later on, because this method is considered one of the indicators of accuracy that is used as an alternative to inferential statistics based on specific assumptions to a model when those assumptions are not fulfilled in this case.

As a third step in the SEM model, the critical ratios of the estimated unstandardized regression coefficient values to its standard error of the saturated <sup>(13)</sup> generality predictor model were calculated for the ability of Jordanian hospital employees' PSM to predict their ethical behaviour, in addition to estimating the standardized regression coefficient for it, as shown in Table 4-20.

**Table 4-20: The estimated unstandardized and standardized regression coefficient of the general model (Level One) of PSM's ability to predict ethical behaviour**

Path for (Level One) Model	Estimates of				CR	Sig.	R <sup>2</sup>	Decision
	Unstandardized Regression Weights		Standardized Regression Weights					
	B	se of B	$\beta$					
PSM → EB	0.56	0.03	0.60		17.24*	0.00	35.7 2%	Differs from (0)

Note: \*  $p \leq 0.05$

As can be seen from Table 4-20 that there is a statistically significant difference within the alpha level ( $\alpha \leq 0.05$ ) between the estimated unstandardized regression coefficient of the PSM of Jordanian hospital employees in Jordanian public hospitals to predict their ethical behaviour and the reference value of its null hypothesis, which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z value (+1.96) corresponding to the adopted significance level; which indicates the rejection of the general statistical null hypothesis, which states:

“H<sub>0.1</sub>: Public service motivation has a positive statistically significant influence on ethical behaviour in Jordanian public

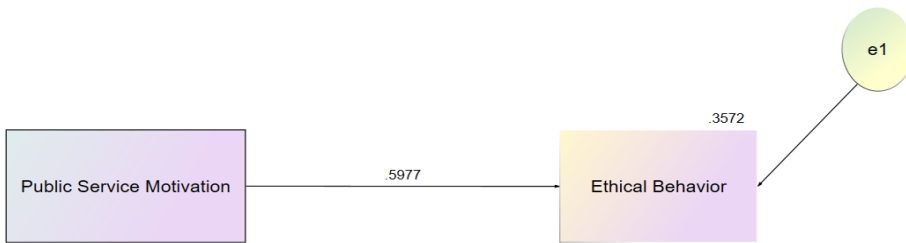
<sup>13</sup> The model is "saturated" in its narrow sense; In the case of having a single predictor, and a single predicted predictor.

hospitals.”, and accepting the alternative hypotheses adopted by the researcher, which states:

“H<sub>1,0</sub>: Public service motivation has a positive statistically significant influence on ethical behaviour in Jordanian public hospitals.”.

In light of the foregoing, it is clear from (Table 4-20) that the PSM of Jordanian hospital staff explains 35.72% of their ethical behaviour in hospitals. More precisely, if their PSM level increases by one standard deviation, their ethical behaviour increases by (0.5977); where the value of the estimated unstandardized regression coefficient was (0.5625) with a standard error of (0.03), as shown in Figures 4-2 and 4-3.

**Figure 4-2: The estimated standardized regression coefficient and the explained variance of the saturated general SEM model (Level One) of PSM in Jordanian public hospitals to predict their ethical behaviour**



**Figure 4-3: The estimated unstandardized regression coefficient, the estimated unstandardized predictor variance, and the estimated unstandardized error variance of the general predictor model of PSM in Jordanian public hospitals to predict their ethical behaviour**

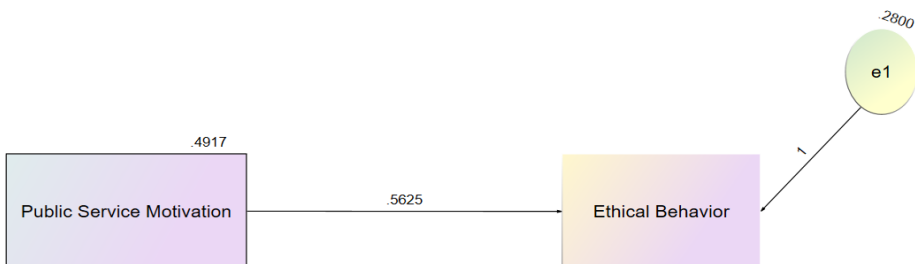


Table (4-21) shows that there is a statistically significant difference ( $\alpha \leq 0.05$ ) between the value of the estimated unstandardized predictor variance (the PSM of Jordanian hospital staff) and the reference value of its null hypothesis, which is (zero). It shows that there is a statistically significant difference within the alpha level ( $\alpha \leq 0.05$ ) between the value of the estimated unstandardized variance of the predicted measurement error (the ethical behaviour of Jordan's hospital staff in hospitals) and the reference value of its null hypothesis, which is (zero).

**Table 4-21: CR values of the estimated coefficients of variance for each of (the predictor, and the measurement error of the predicted) to their standard errors in the saturated general SEM model**

Variances for Exogenous Variables	Estimates of:		CR	Sig.	Decision
	Variance	se of Variance			
PSM	0.49	0.03	16.36*	0.00	Differs from (0)
$\epsilon_1$	0.28	0.02	16.36*	0.00	Differs from (0)

Note: \*  $p \leq 0.05$

#### 4.1.4.2 Level two (PSM dimensions and ethical behaviour)

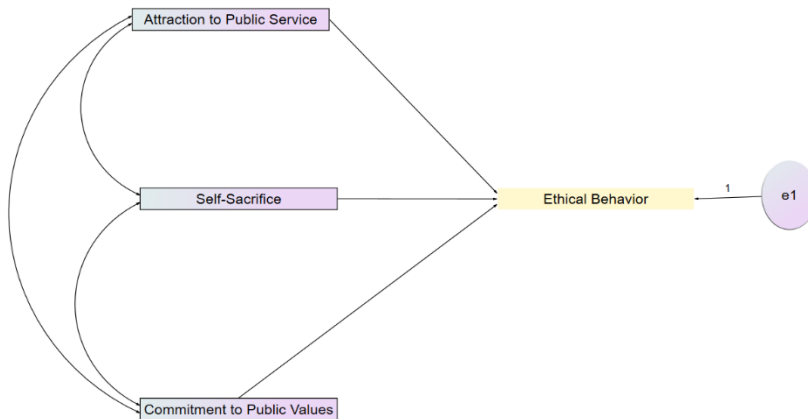
In this model researcher aimed to estimate the influence of PSM dimensions on the ethical behaviour of the employees of Jordanian public hospitals. To achieve this aim, the researcher built a general predictive specifics model as shown in (Figure 4-4) to estimate the influence of (APS, SS, and CPV) to predict their ethical behaviour from their point of view, in order to be able to test its statistical null hypotheses, which states:

H<sub>1.1</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior in Jordanian public hospitals.

H<sub>1.2</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Behavior in Jordanian public hospitals.

H<sub>1.3</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Behavior in Jordanian public hospitals.

Figure 4-4: SEM model of PSM dimensions in Jordanian public hospitals to predict their ethical behaviour



As a first step in the CFA, the *Mahalanobis* distance was calculated for all members of the study sample (567) employees of hospital staff in Jordan; to detect individuals who abuse and violate the possibility of adequately matching the model of the ability of PSM dimensions in hospitals to predict their ethical behaviour with its content data sufficiently because they are far from its centre, as shown in Table 4-22.

Table 4-22: The results of the Mahalanobis distance test for the distance of individuals from a data centre of the influence of PSM dimensions on the ethical behaviour

SN	Case ID	Mahalanobis d <sup>2</sup>	p <sub>1</sub>	p <sub>2</sub>
1	2	10.75*	0.03	0.243
2	47	10.11*	0.039	0.081
3	114	11.46*	0.022	0.122
4	116	12.95*	0.012	0.211
5	177	9.79*	0.044	0.134
6	180	10.22*	0.037	0.11
7	181	9.52*	0.049	0.242
8	239	10.43*	0.034	0.158
9	258	11.52*	0.021	0.235
10	265	11.54*	0.021	0.315
11	286	11.86*	0.018	0.252
12	313	9.88*	0.043	0.133

SN	Case ID	Mahalanobis d <sup>2</sup>	p <sub>1</sub>	p <sub>2</sub>
13	337	10.29*	0.036	0.124
14	383	14.89*	0.005	0.307
15	385	14.98*	0.005	0.505
16	388	12.82*	0.012	0.09
17	389	9.49*	0.05	0.204
18	397	11.30*	0.023	0.121
19	399	10.67*	0.03	0.152
20	404	13.21*	0.01	0.367
21	413	11.46*	0.022	0.184
22	414	12.36*	0.015	0.145
23	417	13.69*	0.008	0.34
24	421	11.16*	0.025	0.118
25	423	13.19*	0.01	0.242
26	424	10.71*	0.03	0.195
27	435	19.05*	0.001	0.354
28	439	10.31*	0.036	0.161
29	440	14.18*	0.007	0.337
30	473	12.91*	0.012	0.135
31	493	10.17*	0.038	0.09
32	503	10.53*	0.032	0.161
33	559	16.11*	0.003	0.486

\*  $p \leq 0.05$

It is clear from Table 4-22 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the calculated *Mahalanobis* distance values for (33) employees of hospital staff in Jordan from a data centre of the level two model, which test the influence of PSM dimensions to predict their ethical behaviour, which required they were dropped from the model in order to be able to reuse the CFA on the data of the remaining (534) employees.

As a second step in the CFA, the skewness and Kurtosis indicators were calculated for the sub-dimensions of PSM for the Jordanian public hospitals employees to predict their ethical behaviour. To reveal the violation of the assumption of a multivariate normal distribution of the responses of the study sample members to the model variables, as shown in Table 4-23.

**Table 4-23: The results of the multivariate normality assessment using skewness and kurtoses indicators of the variables of the predictor model that estimate the influence of PSM dimensions on ethical behaviour in Jordanian public hospitals**

Assessment of normality							
Scale	Variable	Range of Means		Skewness		Kurtosis	
		Min	Max	Statistic	CR	Statistic	CR
PSM	CPV	1	5	-0.032	-0.302	-0.487	-2.298*
	SS	1	5	0.067	0.635	-0.682	-3.215*
	APS	1	4.33	0.330	3.111*	-0.615	-2.901*
	EB	1.25	5	-0.028	-0.260	-0.260	-1.227
	Multivariate					-1.222	-2.038

\*  $p \leq 0.05$

It is evident from Table 4-23 that the absolute value of the Skewness coefficient did not increase for any of the PSM sub-dimensions (i.e., APS, SS, and CPV) to predict their ethical behaviour from criterion (2), where its absolute values ranged between (0.028-0.330). It is clear that the absolute value of the Kurtosis coefficient of any of the model variables did not increase from criterion (7), where its absolute values ranged between (0.260-0.682); which indicates that the assumption of a multivariate normal distribution of the responses of the study sample members to the model variables was not violated.

As a third step in the CFA, the critical ratios of the values of the estimated unstandardized regression coefficients to their standard errors of the saturated model were calculated for the ability of the PSM sub-dimensions (APS, SS, and CPV) to predict their ethical behaviour, in addition to estimating its standard regression coefficients, as shown in Table 4-24.

**Table 4-24:** The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors of the saturated model of the ability of the PSM sub-dimensions to predict ethical behaviour, and the estimated standardized regression coefficients

Paths for (Level Two) Model			Estimates of:		CR	Sig.	Change in Simple R <sup>2</sup>	Simple R	R <sup>2</sup>	Mult. R	
			Unstandardize	Standardize							
			d Regression Weights	d Regression Weights							
		B	se of B	$\beta$							
Ethical Behaviour	←	APS	0.04	0.03	0.05	1.47	0.14 3	0.22%	0.05	44.75 %	0.67
	←	SS	0.06	0.03	0.09	1.99*	0.04 7	0.86%	0.09		
	←	CPV	0.44	0.03	0.59	14.49*	0.00 0	43.67%	0.66		

\*  $p \leq 0.05$



It is clear from Table 4-24 that there is no statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the PSM sub-dimensions of the Jordanian public hospitals employees to predict their ethical behaviour and the reference value of its null hypothesis, which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the range of the Z score corresponding to one standard deviation (-1.96 to +1.96) that do not correspond to the adopted significance level; according to the refusing of the first hypothesis, which states: “**H<sub>1.1</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior in the Jordanian public hospitals**”, and accepting the null hypothesis.

It is clear that there is a statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of SS to predict ethical behaviour in Jordanian public hospitals and the reference value of its null hypothesis of (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z value (+1.96), corresponding to the significance level adopted; which indicates the rejection of the second null hypothesis, and accepting the researcher hypothesis which states: “**H<sub>1.2</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Behavior in the Jordanian public hospitals**”.

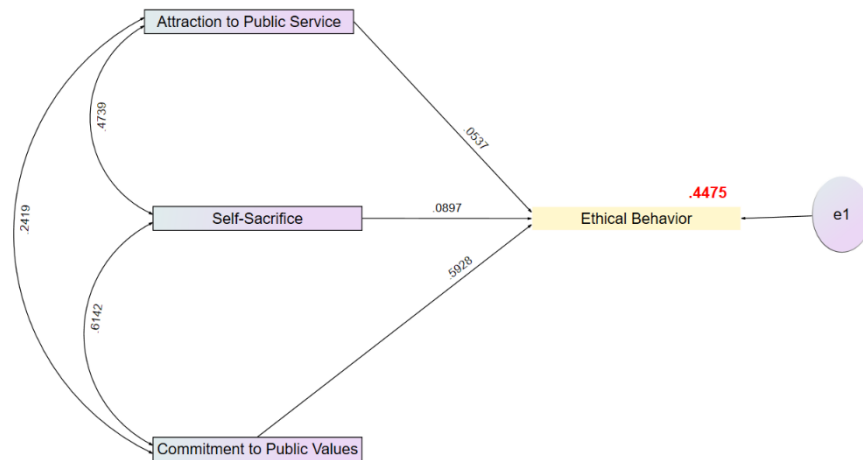
Moreover, it is clear that there is a statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of CPV to predict ethical behaviour and the reference value of its null hypothesis of (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standardized error is greater than the Z value (+1.96), matching to the adopted significance level; which indicates the rejection of the null hypothesis, and accepting the researcher hypothesis, as follows: **H<sub>1.3</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Behavior in the Jordanian public hospitals.**”.

In light of the foregoing, it is clear from Table 4-24 that the PSM sub-dimensions (APS, SS, and CPV) in Jordanian public hospitals collectively explain an amount (44.75%) of ethical behaviour.

However, in the case of an increasing in the APS by one standard deviation, ethical behaviour will increase by (0.0537) from the standard deviation, explaining an amount of (0.22%) of their ethical behaviour in it, where the value of the estimated unstandardized regression coefficient was (0.0430) with a standard error of (0.03).

Also, if SS increased by one standard deviation, the ethical behaviour of the employees in the Jordanian public hospitals will increase by (0.0897) from the standard deviation, explaining (0.86%) of their ethical behaviour; where the value of the estimated unstandardized regression coefficient was (0.0648) with a standard error of (0.03), and in the CPV increased by one standard deviation, their ethical behaviour in it increased by (0.5928) standard deviation. Explaining (43.67%) of their ethical behaviour; where the value of the estimated unstandardized regression coefficient was (0.4436) with a standard error of (0.03), as shown in Figures 4-5 and 4-6.

**Figure 4-5: The estimated standardized regression coefficients and the explained variance of the saturated Level Two SEM model of the ability PSM sub-dimensions to predict ethical behaviour, and the estimated standard correlation coefficients between the predictors**



**Figure 4-6: The estimated unstandardized regression coefficients, the estimated unstandardized predictors variances, and the unstandardized error of the saturated model the of PSM sub-dimensions to predict ethical behaviour, and the estimated unstandardized coefficients co-variances between the predictors**

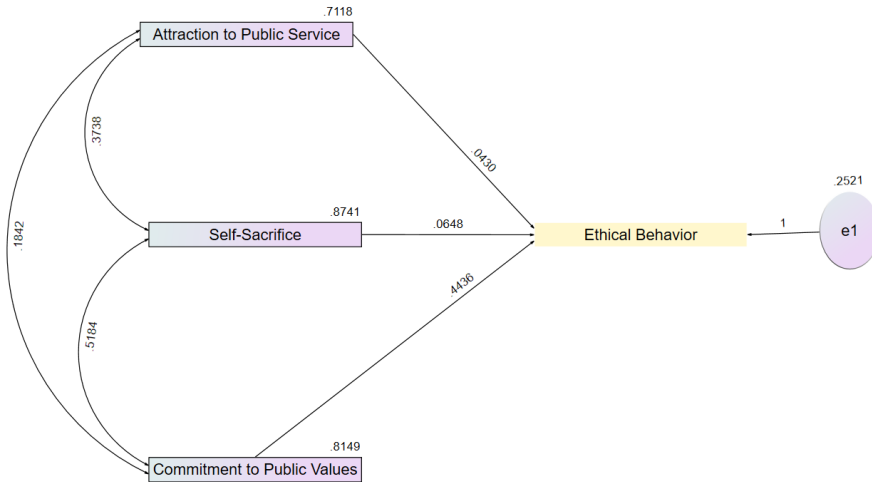


Table 4-25 shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the coefficients of co-variances the unstandardized predictors [PSM (APS, SS, and CPV)] estimated and the reference value of null hypothesis of (Zero), which ranged from (0.18-0.52) with standardized errors ranging from (0.03-0.04), where the values of the critical ratio of the coefficients of the unstandardized covariances estimated to standard errors were greater than the Z score (+1.96) that corresponds to the adopted significance level. It also shows the values of the standard correlation coefficients for the predictors [PSM (APS, SS, and CPV)] that ranged between (0.24-0.61).

**Table 4-25: The estimated values of the critical ratios of the coefficients of unstandardized covariances to their standardized errors and the estimated values of the standard correlation coefficients of the saturated model of PSM sub-dimensions to predict ethical behaviour**

Relation for (Level two) model between the operands of the pair			Estimates of:			CR	Sig.
First	↔	Second	Covariance	se of Covariance	Standardized Correlation		
SS	↔	CPV	0.52	0.04	0.61	12.08*	0.00
APS	↔	CPV	0.18	0.03	0.24	5.43*	0.00
APS	↔	SS	0.37	0.04	0.47	9.89*	0.00

\*  $p \leq 0.05$

Table 4-26 shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the estimated unstandardized variance values for the predictors [PSM (APS, SS, and CPV) in Jordanian public hospitals] and the reference values of their null hypotheses of (zero). It shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized variance of the predicted measurement error (the ethical behaviour of Jordan's hospital staff in hospitals) and the reference value of its null hypothesis, which is (zero).

**Table 4-26: critical ratios values for the estimated unstandardized variances coefficients for each of (the predictors, and the measurement error of the predicted) to the standard errors of the saturated model of the ability of PSM sub-dimensions to predict ethical behaviour**

Variances for Exogenous Variables	Estimates of		CR	Sig.
	Variance	se of Variance		
APS	0.71	0.04	16.33*	0.00
SS	0.87	0.05	16.33*	0.00
CPV	0.82	0.05	16.33*	0.00
$e_1$	0.25	0.02	16.33*	0.00

\*  $p \leq 0.05$

#### **4.1.4.3 Level three (PSM dimensions and ethical behaviour dimensions)**

In this model researcher aimed to estimate the influence of PSM dimensions on ethical behaviour dimensions of the employees of Jordanian public hospitals to untangle the narrower relationships between the sub-variables. To achieve this aim, the researcher built a specifics model as shown in (Figure 4-7) to estimate the relationship of [PSM (APS, SS, and CPV) in Jordanian public hospitals] to predict their [ethical behaviour (EBS, EBCW, and ELS) in Jordanian public hospitals], in order to be able to test the formulated hypotheses, which states:

*H<sub>1.1.1</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals.*

*H<sub>1.1.2</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Co-workers in the Jordanian public hospitals.*

*H<sub>1.1.3</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals.*

*H<sub>1.2.1</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals.*

*H<sub>1.2.2</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Behavior of Co-workers in the Jordanian public hospitals.*

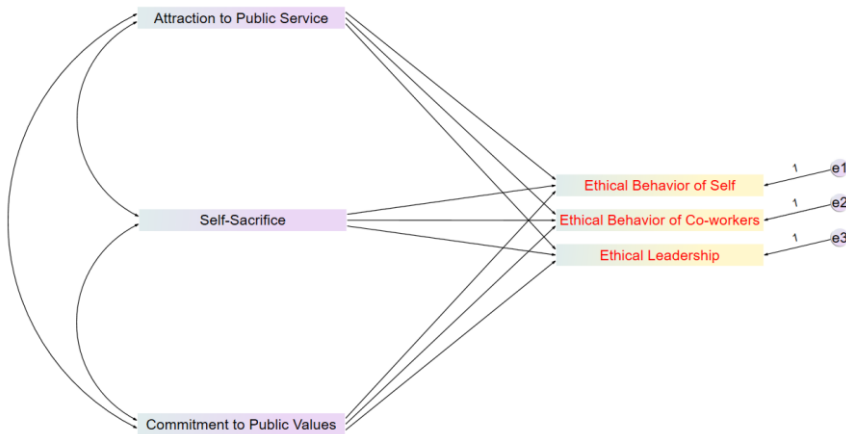
*H<sub>1.2.3</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals*

*H<sub>1.3.1</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals*

**H<sub>1.3.2</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Brhavior of Co-workers in the Jordanian public hospitals**

**H<sub>1.3.3</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals.**

Figure 4-7: SEM model (Level Three) of PSM dimensions in Jordanian public hospitals to predict ethical behaviour dimensions



As a first step in the CFA, the *Mahalanobis* distance was calculated for all members of the study sample (567) employees of public hospital employees in Jordan; to detect individuals who violate the possibility of matching the dimensions PSM in hospitals to predict the dimensions of their ethical behaviour with its content data sufficiently because they are far from its centre, as shown in Table 4-27.

**Table 4-27: The results of the Mahalanobis distance test for the distance of individuals from a data centre of the SEM model of PSM sub-dimensions in Jordanian public hospitals to predict the dimensions of ethical behaviour**

SN	Case ID	Mahalanobis <sup>d2</sup>	<i>p</i> <sub>1</sub>	<i>p</i> <sub>2</sub>
1	61	12.76*	0.047	0.065
2	101	18.80*	0.005	0.116
3	116	15.88*	0.014	0.004
4	174	19.65*	0.003	0.111
5	184	18.21*	0.006	0.002
6	223	17.70*	0.007	0.001
7	258	15.84*	0.015	0.001
8	265	16.92*	0.010	0.001
9	289	17.91*	0.006	0.001
10	337	12.92*	0.044	0.101
11	360	18.62*	0.005	0.007
12	371	13.77*	0.032	0.019
13	383	14.92*	0.021	0.000
14	385	17.60*	0.007	0.000
15	388	15.06*	0.020	0.001
16	389	16.85*	0.010	0.001
17	397	18.27*	0.006	0.005
18	399	16.15*	0.013	0.004
19	404	15.19*	0.019	0.001
20	413	12.76*	0.047	0.091
21	414	12.70*	0.048	0.039
22	417	18.62*	0.005	0.060
23	419	14.85*	0.021	0.000
24	422	12.86*	0.045	0.087
25	423	13.23*	0.039	0.067
26	435	20.37*	0.002	0.390
27	440	14.20*	0.027	0.005
28	445	26.17*	0.000	0.111
29	473	15.01*	0.020	0.001
30	488	15.85*	0.015	0.002
31	490	15.64*	0.016	0.001
32	514	20.06*	0.003	0.199
33	531	13.57*	0.035	0.028
34	532	12.72*	0.048	0.052
35	534	13.10*	0.041	0.074
36	541	15.24*	0.018	0.002
37	559	18.62*	0.005	0.022

\*  $p \leq 0.05$

It is clear from (Table 4-27) that there is a statistically significant difference ( $\alpha = 0.05$ ) between the calculated *Mahalanobis* distance values for (37) employees of hospital staff in Jordan from a data centre of the SEM model of PSM dimensions to predict the dimensions of ethical behaviour, which It was necessary to drop them from the dataset of the model in order to be able to reuse the CFA on the data of the remaining (530) employees of hospital staff in Jordan.

As a second step in the CFA, the Skewness and Kurtosis indicators were calculated for the dimensions of PSM to predict the dimensions of ethical behaviour. To reveal a violation of the assumption of a multivariate normal distribution of the responses of the study sample members to the model variables, as shown in Table (4-28).

**Table 4-28: The results of the multivariate normal distribution test using the Skewness and Kurtosis indicators of the sub-dimensions of PSM to predict the sub-dimensions of ethical behaviour**

Scale	Variable	Assessment of Normality					
		Range of Means		Skewness		Kurtosis	
		Min	Max	Statistic	CR	Statistic	CR
PSM	CPV	1	5	-0.03	-0.29	-0.42	-1.97*
	SS	1	5	0.09	0.88	-0.68	-3.19*
	APS	1	4.33	0.33	3.07*	-0.63	-2.97*
EB	EBS	1	5	0.19	1.79	-0.29	-1.36
	EBC	1	5	-0.29	-2.69	-0.48	-2.27*
	EBS	1	5	-0.11	-1.05	-0.56	-2.62*
Multivariate						-0.32	-0.37

\*  $p \leq 0.05$

It is evident from (Table 4-28) that the absolute value of the Skewness coefficient did not increase for any of the dimensions of PSM in the Jordanian public hospitals to predict the dimensions of ethical behaviour from criterion (2), where its absolute values ranged between (-0.03-0.33). It is clear that the absolute value of the Kurtosis coefficient of any of the model variables did not increase from criterion (7), where its absolute values ranged between (-0.29 to -0.68); which indicates that the assumption of a multivariate normal distribution of the responses of the study sample members to the model variables was not violated.



As a third step in the CFA, the values of the modification indices of the coefficients of covariances the non-normative (standard correlation) were monitored for each predicted pair of errors measuring the dimensions of ethical behaviour for each of (EBS, EBC, and ELS) that exceed the standard criterion (4), and treating them to become realistic by creating a covariance (correlation) for each pair of errors measuring the dimensions of the predicted ethical behaviour, as shown in Table 4-29.

**Table 4-29: Modification indices values of the unstandardized covariance coefficients (standard correlation) for each pair of predicted ethical behaviour dimensions measurement errors, and their treatment status**

Covariance for operands of the pair		MI	Par Change	Status
Operand <sub>1</sub>	↔ Operand <sub>2</sub>			
e <sub>2</sub>	↔ e <sub>3</sub>	83.706*	0.29	Treated; within its Scale
e <sub>1</sub>	↔ e <sub>2</sub>	32.700*	0.134	Treated; within its Scale

\* MI values greater than criterion (4)

As a fourth step in the CFA, the values of the fit indices [ $\chi^2$ ,  $\chi^2/df$ , SRMR, GFI, AGFI, NFI, IFI, TLI, CFI (RNI), RMSEA, information Criteria (AIC, BCC, BIC, CAIC)] were monitored for the SEM model of the ability of the PSM dimensions of Jordanian public hospitals employees to predict the dimensions of their ethical behaviour after and before treating the values of the modification indices for the unstandardized coefficients of variance associated with each predicted pair of measurement errors of the sub-dimensions of ethical behaviour for each of (EBS, EBC, and ELS) that exceed criterion (4), as shown in Table 4-30.

Table 4-30: The result of the difference equation between the values of  $\chi^2$  for the two SEM models of the ability of the PSM dimensions to predict the dimensions of ethical behaviour

Fit Indices		Comparison between values of			Which Model Fitting More?
		Second (Fitted)		First (Unfitted)	
Description	Criterion	Models Before deleting Paths			
Number of distinct sample moments		21		21	
Number of distinct parameters to be estimated		20		18	
$C_{min}(\chi^2)$		3.432	<	125.106*	Second 121.674*
Degrees of freedom (21-xx)		1	<	3	2
Sig.		0.064	>	0.00	0.00
$C_{min}/df=(\chi^2/df)$	< 5	3.432#	<	41.702	Second
SRMR	< 0.08	0.010	<	0.070	Second
GFI	> 0.95	0.998	>	0.930	Second
AGFI	> 0.90	0.955	>	0.509	Second
NFI	$\delta_1$ > 0.95	0.997	>	0.891	Second
IFI	$\delta_2$ > 0.90	0.998	>	0.893	Second
TLI	$\rho^2$ > 0.95	0.968	>	0.460	Second
CFI(RNI)	> 0.90	0.998	>	0.892	Second
RMSEA	< 0.08	0.068	<	0.277*	Second
CI of 90%	Lower Limit	0.000		0.237	
	Higher Limit	0.152		0.320	
Sig. for Hypothesis of (P close)		0.243	>	0.000	Second
AIC	< the previous model	43.432	<	161.106	Second
BCC	< the previous model	43.968	<	161.589	Second
BIC	< the previous model	128.889	<	238.018	Second
CAIC	< the previous model	148.889	<	256.018	Second

\* Goodness-of-fit: within the threshold of criterion (3)

# Acceptable: within the threshold of criterion (5); \*  $p \leq 0.05$

The previous table represents the result of the difference equation between the values of  $\chi^2$  for the two SEM models of the ability of the PSM dimensions to predict the dimensions of ethical behaviour after and before treating the values of the modification indices for the estimated unstandardized covariance coefficients for each pair of measurement errors for each pair of prediction measurement errors of the ethical behaviour dimensions contained in the first model (Unfitted) and compare the values of their fit indices.

It is noticed from Table 4-30 that all fit indices have been achieved after the treatment of the modification indices for the estimated unstandardized covariance coefficients for each predicted pair measurement errors of the ethical behaviour dimensions (i.e., EBS, EBC, and ELS) that exceed the criterion (4) contained in the second (fitted) model that concern the ability of dimensions of PSM to predict the dimensions of ethical behaviour compared to what it was in the first (Unfitted) model; where the value of  $\chi^2$  became insignificant ( $\alpha=0.05$ ), the value of  $\chi^2/df$  became acceptable because it was less than criterion (5) and greater than criterion (3), and the values of the fit indices (GFI, NFI, TLI) became greater than criterion (0.95), the values of the fit indices (AGFI, IFI, CFI(RNI)) became greater than the standard (0.90), the values of the two conformity indexes (SRMR, REMSEA) became less than the standard (0.08), and the values of all the information criteria (AIC, BCC, BIC, CAIC) in the second (fitted) model is lower than in the first (Unfitted) model.

In addition to the above, the difference between the  $\chi^2$  values of the second (Fitted) model and the first (Unfitted) model with the value of (121.674) at two degrees of freedom of the absolute value of the difference between the degrees of freedom of the second and first models (ABS(1-3)) was statistically significant ( $\alpha = 0.05$ ); and that to calculate the second (Fitted) model because it has a smaller  $\chi^2$  value of (3.432) than it is in the first (Unfitted) model because it has a larger value (125.106).

As a fifth step in the CFA, the critical ratios of the values of the estimated unstandardized regression coefficients to their standard errors of the second (Fitted) model were calculated for the ability PSM dimensions (i.e., APS, SS, and CPV) to predict the dimensions ethical behaviour (i.e., EBS, EBC, and ELS), in addition to the estimated standardized regression coefficients, as shown in Table 4-31.

Table 4-31: The values of the critical ratios of the estimated unstandardized regression coefficients to standardized errors of the second (fitted) model for the ability of the PSM dimensions to predict the dimensions of ethical behaviour, and the estimated standardized regression coefficients

Paths for (Level Three) Model	Estimates of:					CR	Sig.	Change in Simple $R^2$	Simple $R$	$R^2$	Mult. $R$
	Unstandardized Regression Weights		Standardized Regression Weights								
	B	se of B	$\beta$								
APS → <sup>1</sup>	0.05	0.04	0.05		1.38	0.168	0.16%	0.04			
SS → <sup>1</sup> EBS	0.10	0.04	0.11		2.53*	0.011	1.06%	0.10	54.59%	0.74	
CPV → <sup>1</sup>	0.64	0.04	0.66		17.53*	0.000	53.36%	0.73			
APS → <sup>1</sup>	-0.10	0.05	-0.09		-1.87	0.062	0.98%	0.10			
SS → <sup>1</sup> EBC	-0.05	0.06	-0.05		-0.85	0.398	0.11%	0.03	17.00%	0.41	
CPV → <sup>1</sup>	0.48	0.06	0.45		8.83*	0.000	15.72%	0.40			
APS → <sup>1</sup>	0.19	0.05	0.18		4.03*	0.000	5.13%	0.23			
SS → <sup>1</sup> ELS	0.13	0.05	0.14		2.53*	0.011	0.98%	0.10	18.65%	0.43	
CPV → <sup>1</sup>	0.23	0.05	0.23		4.55*	0.000	12.53%	0.35			

\*  $p \leq 0.05$

It is clear from Table 4-31 that there is no statistically significant influence ( $\alpha = 0.05$ ) for the APS on EBS and the reference value of the null hypothesis is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (-1.96 to +1.96) that do not correspond to the adopted significance level; which indicates acceptance of the null statistical hypothesis and refusing the researcher hypothesis which states: *H<sub>1.1.1</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals.*

The results reveal that there is a statistically significant influence ( $\alpha = 0.05$ ) for SS on the EBS and the reference value of the null hypothesis which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (-1.96 to +1.96) that do not correspond to the adopted significance level; which indicates refusing of the null statistical hypothesis, and accepting the researcher hypothesis which states: *H<sub>1.2.1</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals.*

The results show that there is a statistically significant influence ( $\alpha = 0.05$ ) for CPV on the EBS and the reference value of his null hypothesis which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (+1.96) that do match the adopted significance level; which indicates refusing of the null statistical hypothesis, and accepting the researcher hypothesis which states: *H<sub>1.3.1</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals.*

In light of the foregoing, it is clear from Table 4-31 that the dimensions of PSM (I.e., APS, SS, and CPV) of the Jordanian public hospital's employees combined explain (54.59%) of their EBS. In case their APS increased with one standard deviation, so their EBS will be increased (0.0463) from the standard deviation, to explain (0.16%) of EBS, where the value of the estimated unstandardized regression

coefficient was (0.0483) with a standard error of (0.04). Hence, in case SS increased with one standard deviation, so EBS will be increased by (0.1052) from the standard deviation, with explaining an amount of (1.06%) from EBS; where the value of the estimated unstandardized regression coefficient was (0.0980) with a standard error of (0.04), and in case CPV increased with one standard deviation, so EBS will be increase by (0.6557) from the standard deviation, to explain an amount of (53.36%) of the employee's EBS sub-dimension; where the value of the estimated unstandardized regression coefficient was (0.6429) with a standard error of (0.04), as shown in Figures 4-8 and 4-9.

It is clear from Table 4-31 that there is no statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of APS to predict the EBC for the employees and the reference value of its null hypothesis which is (zero), where the value of the critical ratio of the estimated untenderized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (-1.96 to +1.96) that do not correspond to the adopted significance level; which indicates the acceptance of the null hypothesis, and refusing the alternative hypothesis which stats: *H<sub>1.1.2</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Co-workers in the Jordanian public hospitals.*

The results prevail that there is no statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of SS to predict the EBC for the employees and the reference value of its null hypothesis which is (zero), where the value of the critical ratio of the estimated untenderized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (-1.96 to +1.96) that do not correspond to the adopted significance level; which indicates the acceptance of the null hypothesis and then refusing the alternative hypothesis which states: *H<sub>1.2.2</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Brhavior of Co-workers in the Jordanian public hospitals.*

The results show that there is a statistically significant influence ( $\alpha = 0.05$ ) for CPV on the EBC and the reference value of his null

hypothesis which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (+1.96) that do match the adopted significance level; which indicates refusing of the null statistical hypothesis, and accepting the researcher hypothesis which states: *H<sub>1.3.2</sub>: Commitment to Public Values has a positive statistically significant influence on Ethical Brhavior of Co-workers in the Jordanian public hospitals.*

In the light of the above considerations, it is clear from Table 4-31 that PSM with its dimensions (i.e., APS, SS, and CPV) of the Jordanian public hospital employees explain an amount of (17.00%) of their EBC. In case their APS increased with one standard deviation, their EBC will be regressed by (0.0848) from their standard deviation, to explain the amount of (0.98%) from EBC, where the value of the estimated unstandardized regression coefficient was (-0.0977) with a standard error of (0.05). Similarly, in the case of SS increased with one standard deviation, EBC will be regressed by (0.0475) from the standard deviation, to explain an amount (0.11%) of the EBC; where the value of the estimated unstandardized regression coefficient was (-0.0489) with a standard error of (0.06), and in case of CPV increased with one standard deviation, EBC will be regressed by (0.4464) from the standard deviation from, to explain an amount of (15.72%) of EBC; where the value of the estimated unstandardized regression coefficient was (0.4830) with a standard error of (0.06), as shown in Figures 4-8 and 4-9.

It is clear from Table 4-31 that there is a statistically significant influence ( $\alpha = 0.05$ ) for the APS on ELS and the reference value of the null hypothesis which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (+1.96) that do resemble the adopted significance level; which indicates refusing of the null statistical hypothesis and accepting the researcher hypothesis which states: *H<sub>1.1.3</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals.*

The results indicate that there is a statistically significant influence ( $\alpha = 0.05$ ) for the SS on ELS and the reference value of the null hypothesis which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (+1.96) that do resemble the adopted significance level; which indicates refusing of the null statistical hypothesis, and accepting the researcher hypothesis which states: **H<sub>1.2.3</sub>: *Self-Sacrifice* has a positive statistically significant influence on *Ethical Leadership* in the Jordanian public hospitals.**

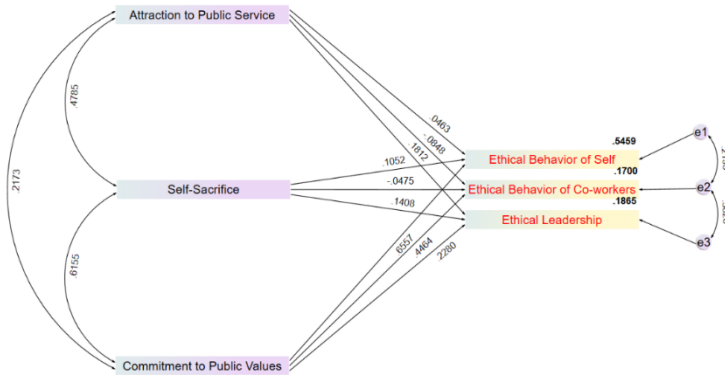
Accordingly, results signify that there is a statistically positive significant influence at the alpha level ( $\alpha = 0.05$ ) for the CPV on ethical leadership and the reference value of the null hypothesis which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the Z score corresponding to one standard deviation (+1.96) that do resemble the adopted significance level; which indicates refusing of the null statistical hypothesis and accepting the researcher hypothesis which states: **H<sub>1.3.3</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Leadership* in the Jordanian public hospitals.**

In the light of the above reporting, it is clear from Table 4-31 that PSM with its dimensions (i.e., APS, SS, and CPV) of the Jordanian public hospital employees explain an amount of (18.65%) of their ELS. In case their APS increased by one standard deviation their ELS will be regressed (0.1812) from their standard deviation, to explain the amount of (5.13%) from ELS, where the value of the estimated unstandardized regression coefficient was (0.1914) with a standard error of (0.05). Correspondingly, in the case of SS increased with one standard deviation, ELS will be regressed by (0.1408) from the standard deviation, to explain an amount (0.98%) of the ELS; where the value of the estimated unstandardized regression coefficient was (0.1329) with a standard error of (0.05), and in case of CPV increased with one standard deviation, ethical leadership will be regressed by (0.2280) from the standard deviation from, to explain an amount of (12.53%) of ELS; where the value of the estimated unstandardized regression



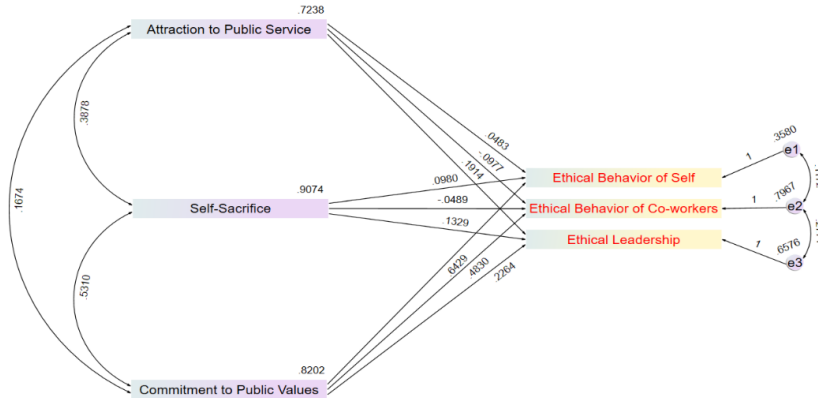
coefficient was (0.2264) with a standard error of (0.05), as shown in Figures 4-8 and 4-9.

**Figure 4-8: The estimated standardized regression coefficients and the explained variance of the SEM model of the PSM dimensions to predict the dimensions of ethical behaviour**



*Note: This model represents the estimated standardized regression coefficients and the explained variance of the SEM model of the PSM dimensions to predict the dimensions of ethical behaviour; the estimated standard correlation coefficients between the predictors, and the estimated standard correlation coefficients between measurement errors for the dimensions of predicted ethical behaviour*

**Figure 4-9: The estimated unstandardized regression coefficients and the unstandardized explained variance of the SEM model of PSM dimensions to predict the sub-dimensions of ethical behaviour**



*Note: This model represents the estimated unstandardized regression coefficients, the variances of the estimated unstandardized predictors, and the variance of the estimated unstandardized measurement error of the SEM model of the PSM dimensions to predict the dimensions of ethical behaviour and the coefficients of estimated unstandardized covariances between predictors, and coefficients of estimated unstandardized co-variances between measurement errors for the PSM sub-dimensions as a predictor of ethical behaviour*

Table (4-32) shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the unstandardized coefficients of covariances for the predictors [PSM (APS, SS, and CPV)], which ranged from (0.17-0.53) with standard errors ranging from (0.03-0.04), Where the values of the critical ratio of the estimated unstandardized coefficients of variances to their standard errors were greater than the Z score (+1.96). It shows that the values of the standardized correlation coefficients for the predictors [PSM (APS, SS, and CPV)] ranged between (0.22-0.62). More, it shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of unstandardized coefficients of covariances arising from the treatment of the values of the modification indices of the pairs of measurement errors of the sub-dimensions of ethical behaviour (i.e., EBS, EBC, and Ethical leadership) and the reference values for its null hypotheses, which are (zero), which ranged between (0.12-0.28), with standard errors that

ranged between (0.02-0.03), where the estimated values of the critical ratio of the coefficients of unstandardized coefficients of covariances were greater than the Z score corresponding to one standard error (+1.96) that corresponds to the adopted significance level. It also shows the values of the standard correlation coefficients arising from the treatment of the values of the modification indices for the estimated pairs of measurement errors of the estimated dimensions of ethical behaviour, which ranged between (0.22-0.38).

**Table 4-32: The saturated standardized and unstandardized SEM model for the influence of the dimensions of PSM on ethical behaviour dimensions**

Relation for (Level Three) model between operands of the pair			Estimates of:				CR	Sig.
			Unstandardized		Standardized			
			Covariance	SE of Covariance	Correlation			
Operand <sub>1</sub>	↔	Operand <sub>2</sub>						
APS	↔	SS	0.39	0.04	0.48	9.93*	0.00	
APS	↔	CPV	0.17	0.03	0.22	4.88*	0.00	
SS	↔	CPV	0.53	0.04	0.62	12.06*	0.00	
e <sub>2</sub>	↔	e <sub>3</sub>	0.28	0.03	0.38	8.38*	0.00	
e <sub>1</sub>	↔	e <sub>2</sub>	0.12	0.02	0.22	5.30*	0.00	

\*  $p \leq 0.05$

*Note: the table represent the values of the critical ratios of the estimated unstandardized coefficients of the co-covariance to their standard errors and the values of the estimated standardized correlation coefficients of the predictive saturated level three model concerning the capacity of the sub-dimensions of PSM to predict the sub-dimensions of ethical behaviour*

Table 4-33 shows that there is a statistically significant difference ( $\alpha = 0.05$ ) between the estimated unstandardized covariance values for the predictors [PSM (APS, SS, and CPV) in Jordanian public hospitals] and the reference values of its null hypotheses is (zero). It shows that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the values of the estimated unstandardized covariance values of the predicted measurement error (the ethical behaviour of Jordan's hospital employees in hospitals) and the reference value of its null hypothesis, which is (zero).

**Table 4-33:** The values of the critical ratios of the estimated unstandardized covariances coefficients for each of (the predictors, and the measurement error of the predicted) to their standard errors of the SEM model of the ability of PSM dimensions to predict the dimensions of ethical behaviour

Variances for Exogenous Variables	Estimates of:		CR	Sig.
	Variance	se of Variance		
APS	0.72	0.05	16.26*	0.00
SS	0.91	0.06	16.26*	0.00
CPV	0.82	0.05	16.26*	0.00
e <sub>1</sub>	0.36	0.02	16.26*	0.00
e <sub>2</sub>	0.80	0.05	16.55*	0.00
e <sub>3</sub>	0.66	0.04	16.26*	0.00

\*  $p \leq 0.05$

And with the aim of moving the level three model of the ability of the sub-dimensions of [PSM (APS, SS, and CPV) in Jordanian public hospitals] to predict the dimensions of ethical behaviour for each of (i.e., EBS, EBC, and ELS) from being “Adopted” in accordance with the hypotheses of the study as a “Proposed” model; the path of SS predicting EBC was dropped because it is the least intrinsic path ( $\alpha = 0.05$ ), where its significance reached (0.398: Table 31), as shown in Table 4-34.

**Table 4-34: The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors of the third (Fitted) model of the ability of PSM dimensions to predict the dimensions of ethical behaviour, with dropping the path of SS predicting EBC, and their estimated standardized regression coefficients**

Paths for (Level Three) Model	Estimates of:				CR	Sig.	Change in Simple R <sup>2</sup>	Simple R	R <sup>2</sup>	Mult. R
	Unstandardized Regression Weights		Standardized Regression Weights							
	B	se of B	$\beta$							
EBS	← APS	0.05	0.04	0.04	1.30	0.193	0.16%	0.04	54.63%	0.74
	← SS	0.11	0.04	0.11	2.78*	0.005	1.06%	0.10		
	← CPV	0.64	0.04	0.65	17.57*	0.000	53.36%	0.73		
EBC	← APS	-0.10	0.05	-0.10	-2.51*	0.012	15.72%	0.40	16.89%	0.41
	← SS	<i>Path hypothesis accepted</i>								
	← CPV	0.46	0.04	0.42	10.37*	0.000	0.98%	0.10		
ELS	← APS	0.19	0.05	0.17	3.94*	0.000	5.13%	0.23	18.86%	0.43
	← SS	0.15	0.05	0.16	3.09*	0.002	0.98%	0.10		
	← CPV	0.22	0.05	0.22	4.48*	0.000	12.53%	0.35		

\*  $p \leq 0.05$

It is clear from Table 4-34 that there is no statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of APS to predict EBS where the reference value of his null hypothesis is (zero), and the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error was within the range of Z score (-1.96 to +1.96) that do not match to the adopted significance level ( $\alpha = 0.05$ ); which indicates acceptance of the statistical null hypothesis and then refusing the alternative hypothesis which states: *H<sub>1.1.2</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Behavior of Co-workers in the Jordanian public hospitals*”; for this, the path of APS predicting EBS was dropped because it is the least significant path ( $\alpha = 0.05$ ), where its significance was (0.193: Table 4-34), as shown in Table 35.

It is also clear from Table 4-35 that there is a statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of SS in Jordanian public hospitals to predict the EBS and the reference value of the null hypothesis, which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z score (+1.96), which corresponds to the adopted significance level; which indicates accepting the alternative hypothesis that states: *H<sub>1.2.1</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Behavior of Self in the Jordanian public hospitals*.

Table 4-35: The values of the critical ratios of the estimated unstandardized regression coefficients to their standard errors of the fourth (Fitted) SEM model of the ability of PSM dimensions in Jordanian public hospitals to predict the dimensions of ethical behaviour, with the dropping of the two paths of the ability of APS and SS to predict EBS and EBC and their estimated standardized regression coefficients

Paths for (Level Three) model	Estimates of:			CR	Sig.	Change in Simple R <sup>2</sup>	Simple R	R <sup>2</sup>	Mult. R	
	Unstandardized Regression Weights		Standardized Regression Weights							
	B	se of B	$\beta$							
	← APS									
EBS	← SS	0.13	0.03	0.14	3.73*	0.00	1.06%	0.10	54.47%	0.74
	← CPV	0.63	0.04	0.65	17.50*	0.00	53.36%	0.73		
	← APS	-0.13	0.05	-0.11	-2.82*	0.005	0.98%	0.10		
EBC	← SS								17.07%	0.41
	← CPV	0.46	0.04	0.42	10.43*	0.00	15.72%	0.40		
	← APS	0.19	0.05	0.18	3.97*	0.00	2.62%	0.16		
ELS	← SS	0.15	0.05	0.16	3.04*	0.00	2.50%	0.16	18.80%	0.43
	← CPV	0.22	0.05	0.22	4.51*	0.00	13.53%	0.37		

\*  $p \leq 0.05$

The results indicate that there is a statistically significant difference ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of CPV in Jordanian public hospitals to predict the EBS and the reference value of the null hypothesis, which is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z score (+1.96), which corresponds to the adopted significance level; which indicates the accepting the alternative hypotheses (according to the proposed model), which states: **H<sub>1.3.1</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Brhavior of Self in the Jordanian public hospitals***

Considering the abovementioned results, it is clear from Table 35 that the two sub-dimensions of PSM (i.e., SS, and CPV) in Jordanian public hospitals collectively explain an amount (54.47%) of the variance of EBS. In the case of the increase of SS by one standard deviation; EBS will be increased by (0.1361) from the standard deviation, to explain an amount of (1.06%) from EBS; where the value of the estimated unstandardized regression coefficient was (0.1269) with a standard error of (0.03), and in the case of an increase CPV therein by one standard deviation, EBS will increases by (0.6464) from the standard deviation, explaining an amount of (53.36%) of EBS; where the value of the estimated unstandardized regression coefficient was (0.6341) with a standard error of (0.04), as shown in Figures 4-10 and 4-11.

It is clear that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of CPV in Jordanian public hospitals to predict the EBC and the reference value of its null hypothesis is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z score (+1.96) corresponding to the adopted significance level ( $\alpha = 0.05$ ); which indicates the rejection of the null hypothesis (according to the proposed model) and accepting the alternative hypothesis, which states: **H<sub>1.3.2</sub>: *Commitment to Public Values* has a positive statistically significant influence on *Ethical Brhavior of Co-workers in the Jordanian public hospitals*.**



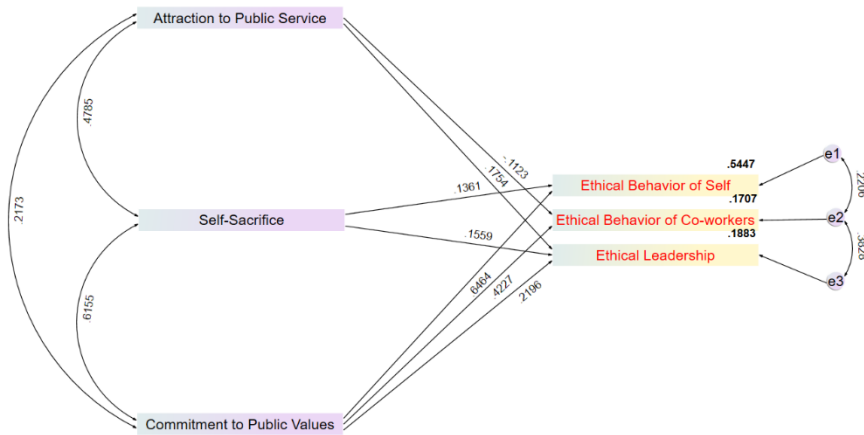
Considering the foregoing results, it is clear from Table 4-35 that the two sub-dimensions of PSM (i.e., APS, and CPV) in hospitals collectively explain an amount (17.07%) of the dimensions of ethical behaviour (EBC). In the case of the increase of APS by one standard deviation, then the EBC will decrease by (0.11361) from the standard deviation, to explain its amount (0.98%) from the EBC, where the value of the estimated unstandardized regression coefficient was (0.1269) with a standard error of (0.05). Furthermore, in the case of an increase in the CPV therein by one standard deviation, the dimension of EBC will increase by (0.1559) from the standard deviation, to explain an amount of (15.72%) of the dimension of EBC; where the value of the estimated unstandardized regression coefficient was (0.1473) with a standard error of (0.04), as shown in Figures 4-10 and 4-11.

It is also evident from Table 4-35 that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of APS in hospitals to predict the dimension of ELS and the reference value of its null hypothesis is (zero), where the value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z score (+1.96) corresponding to the adopted significance level ( $\alpha = 0.05$ ); which indicate the rejection of the null hypothesis (according to the proposed model), and accepting the alternative hypothesis which states: *H<sub>1.1.3</sub>: Attraction to Public Service has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals.*

Moreover, the results indicate that there is a statistically significant difference within the alpha level ( $\alpha = 0.05$ ) between the value of the estimated unstandardized regression coefficient of the ability of SS in Jordanian public hospitals to predict ELS and the reference value of its null hypothesis is (zero). The value of the critical ratio of the estimated unstandardized regression coefficient to its standard error is greater than the Z score (+1.96) corresponding to the adopted significance level ( $\alpha = 0.05$ ); which indicates the rejection of the null hypothesis (according to the proposed model) and accepting the alternative hypothesis, as follow: *H<sub>1.2.3</sub>: Self-Sacrifice has a positive statistically significant influence on Ethical Leadership in the Jordanian public hospitals.*

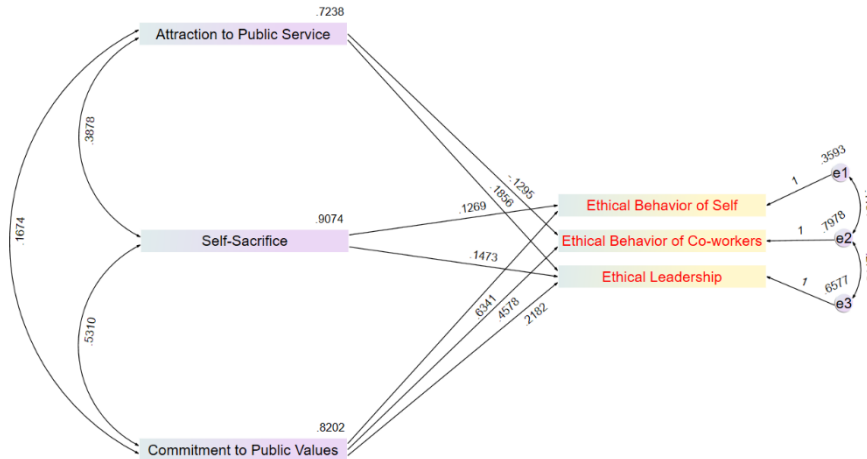
Based on the previous results; it is clear from Table 4-35 that the dimensions of PSM (i.e., APS, SS, and CPV) in the Jordanian public hospitals collectively explain an amount of (18.80%) of the ELS. However, in case of an increase in the APS with one standard deviation, the dimension of ELS in it increases by (0.1754) from the standard deviation, to explain an amount of (2.62%) from employees ELS; where the value of the estimated unstandardized regression coefficient was (0.1856) with a standard error of (0.05), and in the case of the increasing of the SS by one standard deviation, the dimension of the ELS will increase by (0.1559) standard deviation, to explain an amount of (2.5%) of their ELS; where the value of the estimated unstandardized regression coefficient was (0.1473) with a standard error of (0.05), and in the case of an increase in the CPV by one standard deviation, ELS will increase by (0.2196) from the standard deviation; explain an amount of (13.53%) of the ELS; where the value of the estimated unstandardized regression coefficient was (0.2182) with a standard error of (0.05), as shown in Figures 4-10 and 4-11.

**Figure 4-10: The estimated standardized regression coefficients and the explained variance of the Level Three SEM model for the ability of the PSM dimension to predict the dimensions of ethical behaviour after dropping APS and SS paths to predict EBS and EBC**



*Note: this model shows the estimated standardized correlation coefficients between predictors, and estimated correlation coefficients between measurement errors for the sub-dimensions of ethical behaviour, with the dropping of two paths, namely, APS and SS to predict EBS and EBC.*

**Figure 4-11: The estimated unstandardized regression coefficients, the variances of the estimated unstandardized predictors, and the variance of the estimated unstandardized measurement error of the predictor in the level three saturated SEM model of the ability of PSM dimension to predict the dimensions of ethical behaviour**



*Note: This Figure shows the coefficients of the estimated unstandardized covariances between the predictors, and coefficients of estimated covariances between measurement errors for the dimensions of ethical behaviour with the dropping of two paths, namely, APS and SS to predict EBS and EBC.*

Table 4-35 shows that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the values of the estimated unstandardized covariances for the predictors [PSM (APS, SS, and CPV)] and the reference values for the null hypotheses is zero, which ranged from (0.17-0.53) with standard errors ranging from (0.03-0.04), where the values of the critical ratio of the coefficients of the estimated unstandardized covariances to their standard errors were greater than the Z score (+1.96) that corresponds to the adopted significance level ( $\alpha = 0.05$ ). Also, it shows that the values of the estimated standardized correlation coefficients for the predictors [PSM (APS, SS, and CPV)] range between (0.22-0.62).

The results in the table indicate that there is a statistically significant difference within the alpha level ( $\alpha = 0.05$ ) between the values of the estimated unstandardized coefficients of the covariances arising from processing the values of the modification indices of the pairs of measurement errors of the dimensions of ethical behaviour predicted for each of (EBS, EBCW, and ELS) and the reference values of its null hypotheses is zero, which ranged between (0.12-0.28) with standard errors that ranged between (0.02-0.03), where the values of the critical ratio of the estimated coefficients of the unstandardized covariances to their standard errors were greater than the Z score (+1.96) that corresponds to the adopted significance level ( $\alpha = 0.05$ ). It also shows the values of the estimated standardized correlation coefficients arising from the treatment of the modification indices for the pairs of errors measuring the dimensions of ethical (i.e., EBS, EBC, and ELS), which ranged between (0.22-0.38).

Table 4-35: The values of the critical ratios of the estimated unstandardized covariances to their standard errors and the values of the estimated standardized correlation coefficients of the level three predictor model for the ability of the dimensions of PSM to predict their ethical behaviour after adjustment

Relation for the (Level three) model between operands of the pair			Estimates of:			CR	Sig.
Operand <sub>1</sub>	↔	Operand <sub>2</sub>	Unstandardized Covariance	Standardized se of Covariance	Standardized Correlation		
APS	↔	SS	0.39	0.04	0.48	9.93*	0.00
APS	↔	CPV	0.17	0.03	0.22	4.88*	0.00
SS	↔	CPV	0.53	0.04	0.62	12.06*	0.00
e <sub>2</sub>	↔	e <sub>3</sub>	0.28	0.03	0.38	8.38*	0.00
e <sub>1</sub>	↔	e <sub>2</sub>	0.12	0.02	0.22	5.32*	0.00

\*  $p \leq 0.05$

Table 4-36 shows that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the estimated unstandardized variance values for the predictors [PSM (APS, SS, and CPV) in the Jordanian public hospitals] and the reference values of their null hypotheses are (zero). Where the results show that there is a statistically significant difference ( $\alpha = 0.05$ ) between the values of the estimated unstandardized variance of the predicted measurement error (the ethical behaviour of Jordanian public hospital employees) and the reference value of its null hypothesis, which is (zero).

**Table 4-36: The values of the critical ratios of the estimated unstandardized coefficients of variances for each of (the predictors, and the measurement errors) to their standard errors of the saturated level three SEM model of the capacity of PSM dimensions to predict the dimensions of ethical behaviour.**

Variances for Exogenous Variables	Estimates of:		CR	Sig.
	Variance	se of Variance		
APS	0.72	0.05	16.26*	0.00
SS	0.91	0.06	16.26*	0.00
CPV	0.82	0.05	16.26*	0.00
e <sub>1</sub>	0.36	0.02	16.26*	0.00
e <sub>2</sub>	0.80	0.05	16.55*	0.00
e <sub>3</sub>	0.66	0.04	16.26*	0.00

\*  $p \leq 0.05$

Lastly, the values of the fit indicators [ $\chi^2$ ,  $\chi^2/df$ , SRMR, GFI, AGFI, NFI, IFI, TLI, CFI (RNI), RMSEA, Information Criteria (AIC, BCC, BIC, CAIC)] were compared after dropping two paths, namely, APS and SS to predict EBS and EBC from the fourth (Fitted) model to the ability of the sub-dimensions of PSM (i.e., APS, SS, and CPV) to predict the sub-dimensions of ethical behaviour (i.e., EBS, EBC, and ethical leadership) and before dropping them from the second (Fitted) model, and calculating the difference between the two values of  $\chi^2$  in the two models, as shown in Table 4-37. However, for easier demonstration of the results of all the aforementioned hypotheses, we present the collected results in Table (4-38).

Table 4-37: The result of the difference equation between the two values of  $\chi^2$  of the model (fourth versus second) for the ability of the PSM dimensions to predict the dimensions of ethical behaviour after and before deleting the insignificant paths mentioned in the second (Fitted) model, and the comparison between the values of their fit indices

Fit Indices		Comparison between values of			Which Model Fitting More?		
Description	Criterion	Fourth (Fitted) Models for Treated PSM Scale by PCA after Deleting two paths	Second (Fitted) before				
Number of distinct sample moments		21		21			
Number of distinct parameters to be estimated		18		20	Both are equivalent 2.407 2 0.30		
$C_{min}(\chi^2)$		5.839	>	3.432			
Degrees of freedom (21-xx)		3		1			
Sig.		0.12	>	0.064			
$C_{min}/df=(\chi^2/df)$	<	5		1.946 <sup>&amp;</sup>	<	3.432 <sup>#</sup>	after deleting two paths
<b>SRMR</b>	<	0.08		0.012	>	0.010	before deleting two paths
GFI	>	0.95		0.996	<	0.998	before deleting two paths
AGFI	>	0.90		0.974	>	0.955	after deleting two paths
<b>NFI</b>	$\delta_1$	>	0.95	0.995	<	0.997	before deleting two paths
IFI	$\delta_2$	>	0.90	0.998	=	0.998	Both are equivalent
<b>TLI</b>	$\rho^2$	>	0.95	0.987	>	0.968	after deleting two paths
<b>CFI(RNI)</b>		>	0.90	0.997	<	0.998	before deleting two paths
<b>RMSEA</b>	<	0.08		0.042	<	0.068	after deleting two paths
CI of 90%	Lower Limit			0.000		0.000	
	Higher Limit			0.093		0.152	
Sig. for hypothesis of (P close)				0.519	>	0.243	after deleting two paths
<b>AIC</b>	<	the previous model		41.839	<	43.432	after deleting two paths
<b>BCC</b>	<	the previous model		42.322	<	43.968	after deleting two paths
<b>BIC</b>	<	the previous model		118.751	<	128.889	after deleting two paths
<b>CAIC</b>	<	the previous model		136.751	<	148.889	after deleting two paths

<sup>&</sup> *Goodness-of-fit*: within the threshold of criterion (3), <sup>#</sup> *Acceptable*: within the threshold of criterion (5)



It is noted from Table 4-37 that all fit indicators to its criteria have been achieved after two paths from the fourth (Fitted) model of the ability of PSM dimensions to predict the dimensions of ethical behaviour for each of (EBS, EBCW, and ELS) compared to what it was in the second (Fitted) model; where the value of  $\chi^2$  is more fitted than it was in the second model, and the value of the ratio  $\chi^2/df$  is more fitted than it was in the second model; it became less than the exact fit criterion (3), and the fit index (TLI) value became more fitted than it was in the second model, while the two fit indicators (GFI, NFI) values in the second model remained more than they are in the fourth model, and in the fourth model, the value of the conformity index (AGFI) became more fitted than it is in the second model, in the equivalence of the value of the conformity index (IFI) between the fourth and second models, and the value of the conformity index (CFI(RNI)) in the second model remained greater than it is in the fourth model, the value of the fit index (SRMR) remained lower than in the fourth model, and in the fourth model, the value of the fit index (REMSEA) became less than it is in the second model, and the values of all information criteria (AIC, BCC, BIC, CAIC) in the fourth (fitted) model is less than the second (fitted) model.

In addition to the above, the difference between the values of  $\chi^2$  for the second (Fitted) and the first (Unfitted) models is (2.407) at two degrees of freedom of the absolute value of the difference between the degrees of freedom of the fourth and second models (ABS (3-1)) is not statistically significant ( $\alpha = 0.05$ ); with the benefit of the equivalence of the two models [i.e., Fourth: fitted; after dropping the two dimensions of the ability of APS and SS to EBS and EBC from the capacity of PSM sub-dimensions (i.e., APS, SS, and CPV) to predict the dimensions of ethical behaviour (i.e., EBS, EBC, and ethical leadership)] versus [the second: the fitted; before dropping the two dimensions of the ability of APS and SS to EBS and EBC from the capacity of PSM dimensions (i.e., APS, SS, and CPV) to predict the dimensions of ethical behaviour (i.e., EBS, EBC, and ELS)]. Also, in the table (4-39) we presented the hypothesis test summary after deleting paths for easy representation.

Table 4-38: Hypothesis testing results summary

Hypothesis	Relationships	Standardized regression coefficients	<i>p-values</i> *	Hypothesis Results
<b>Level one model</b>				
H <sub>1</sub>	PSM → Ethical behaviour	0.60	0.000	Supported
<b>Level two model</b>				
H <sub>1.1</sub>	APS → Ethical behaviour	0.05	0.143	Not supported
H <sub>1.2</sub>	SS → Ethical behaviour	0.09	0.047	Supported
H <sub>1.3</sub>	CPV → Ethical behaviour	0.59	0.000	Supported
<b>Level three model</b>				
H <sub>1.1.1</sub>	APS → EBS	0.05	0.168	Not supported
H <sub>1.2.1</sub>	SS → EBS	0.11	0.011	Supported
H <sub>1.3.1</sub>	CPV → EBS	0.66	0.000	Supported
H <sub>1.1.2</sub>	APS → EBC	-0.09	0.062	Not supported
H <sub>1.2.2</sub>	SS → EBC	-0.05	0.398	Not supported
H <sub>1.3.2</sub>	CPV → EBC	0.45	0.000	Supported
H <sub>1.1.3</sub>	APS → Ethical leadership	0.18	0.000	Supported
H <sub>1.2.3</sub>	SS → Ethical leadership	0.14	0.011	Supported
H <sub>1.3.3</sub>	CPV → Ethical leadership	0.23	0.000	Supported

\*  $p \leq 0.05$

Table 4-39: Level three model hypothesis testing results after dropping insignificant paths summary

Hypothesis	Relationships	Standardized regression coefficients	<i>p-values</i> *	Hypothesis Results
<b>Level three model after deleting insignificant paths</b>				
H <sub>1.1.1</sub>	APS → EBS		<i>Deleted Path</i>	
H <sub>1.2.1</sub>	SS → EBS	0.14	0.000	Supported
H <sub>1.3.1</sub>	CPV → EBS	0.65	0.000	Supported
H <sub>1.1.2</sub>	APS → EBC	-0.11	0.005	Supported
H <sub>1.2.2</sub>	SS → EBC		<i>Deleted Path</i>	
H <sub>1.3.2</sub>	CPV → EBC	0.42	0.000	Supported
H <sub>1.1.3</sub>	APS → Ethical leadership	0.18	0.000	Supported
H <sub>1.2.3</sub>	SS → Ethical leadership	0.16	0.000	Supported
H <sub>1.3.3</sub>	CPV → Ethical leadership	0.22	0.000	Supported

\*  $p \leq 0.05$

Finally, we took a further step to assure the solidity of the previous structural models and to make sure they were free from Common Method Bias (CMB), even after testing them intensely in the methodology section. However, we performed a full collinearity test, based on the values of Inner Variance Inflation Factors (VIFs), where if the values are less than (3.3), then the model considers free of CMB (Kock, 2021).

The results in the next table (Table 4-40) show that the maximum inner VIF value is 1.61, and the tolerance is under ( $> 0.20$ ); confirming that CMB is not a concern in this model.

**Table 4-40: Full collinearity VIF value and the tolerance for the Level Two SEM Model which predicts the influence of PSM dimensions on ethical behavior**

Level Two SEM Model						
Path		Collinearity Statistics				
Predictor	→ Dependent	Tolerance	VIF	Eigenvalue	Condition Index	
Intercept	→			3.833	1	
APS	→ EB	0.771	1.296	0.082	6.821	
SS	→	0.51	1.96	0.056	8.309	
CPV	→	0.62	1.614	0.029	11.469	
<b>Criteria</b>		<b>&gt; 0.20</b>	<b>&lt; 5</b>	<b>Not Close to 0</b>		<b>&lt; 15</b>

Moreover, the results show that the Level Three SEM model is also free from CMB, where the VIF value ranged from (1.3 to 2.0), and the tolerance was less than the cut point ( $> 0.20$ ), as it illustrated in table 4-41.

**Table 4-41: Full collinearity VIF value and the tolerance for the Third Level SEM Model which predicts the influence of PSM dimensions on ethical behavior dimensions**

<b>Specific to Specific</b>						
<b>Path</b>			<b>Collinearity Statistics</b>			
<b>Predictor</b>	<b>→</b>	<b>Dependent</b>	<b>Tolerance</b>	<b>VIF</b>	<b>Eigenvalue</b>	<b>Condition Index</b>
Intercept	→				3.831	1
APS	→	EBS	0.761	1.313	0.084	6.751
SS	→	EBC	0.496	2.014	0.057	8.216
CPV	→	ELS	0.613	1.63	0.028	11.714
<b>Criteria</b>			<b>&gt; 0.20</b>	<b>&lt; 5</b>	<b>Not Close to 0</b>	<b>&lt; 15</b>

## 4.2 PSM AND ORGANIZATIONAL PERFORMANCE

### 4.2.1 Data envelopment Analysis First stage Analysis

In the first stage of DEA, we applied CCR and BCC models by adopting both orientations (input and output) using MaxDEA 8 Ultra, where the next table (Table 4-42) explains the procedure of analysis that has been used to evaluate the efficiency of the Jordanian public hospitals:

**Table 4-42: first stage DEA models’ analysis summary**

<b>Models’ specifica- tions</b>	<b>Models Description</b>	
	<b>Input oriented with/ adjusting</b>	<b>Output oriented with/without adjusting</b>
Model Type	Multiplier Model	Multiplier Model
Number of Periods	3 (2019-2021)	3 (2019-2021)
Window Width	3	3
Number of Win- dows	1	1
Number of DMUs	27	27
Number of Inputs	4	4
Number of Outputs	4	4
Distance	Radial (CCR 1978; BCC 1984)	Radial (CCR 1978; BCC 1984)
Orientation	Input-oriented	Output-oriented
Returns to Scale	Scale Efficiency (CRS & VRS)	Scale Efficiency (CRS & VRS)

*Note: own production using the results of MaxDEA 8 Ultra*

As it is clear from the previous table that our panel data consist of three years, and our DMUs are 27 units, with a total of 81 observations.

Additionally, it shows the number of included inputs and outputs indications, models' distance, and models' orientation.

Nevertheless, the next table (4-43) shows the results of the first stage DEA before excluding outliers using super efficiency indicator, noting that [*DEA Model 1.3 (Non-Adjusted CRS input Model)*; *DEA Model 2.3 (Non-Adjusted VRS input Model)*; *DEA Model 1.4 (Non-Adjusted CRS output Model)*; *DEA Model 2.4 (Non-Adjusted VRS output Model)*].

**Table 4-43: First stage DEA results before excluding outliers**

<i>DUMs/ Year</i>	<b>DEA Model 1.3</b>	<b>DEA Model 2.3</b>	<b>DEA Model 1.4</b>	<b>DEA Model 2.4</b>
h01{2019}	1	1	1	1
h01{2020}	0.886614	0.952412	0.886614	0.961132
h01{2021}	0.903328	1	0.903328	1
h02{2019}	1	1	1	1
h02{2020}	0.758467	0.863267	0.758467	0.895301
h02{2021}	0.874233	0.902325	0.874233	0.91139
h03{2019}	1	1	1	1
h03{2020}	1	1	1	1
h03{2021}	1	1	1	1
h04{2019}	1	1	1	1
h04{2020}	0.750947	0.770674	0.750947	0.752162
h04{2021}	1	1	1	1
h05{2019}	0.953789	0.956389	0.953789	0.954141
h05{2020}	0.639495	0.669297	0.639495	0.641079
h05{2021}	0.804522	0.81936	0.804522	0.806242
h06{2019}	0.938282	0.946293	0.938282	0.944193
h06{2020}	0.433845	0.448611	0.433845	0.451142
h06{2021}	0.501168	0.505062	0.501168	0.585434
h07{2019}	0.82512	0.857803	0.82512	0.84333
h07{2020}	0.821658	0.83365	0.821658	0.825003
h07{2021}	0.809669	0.82782	0.809669	0.812127
h08{2019}	1	1	1	1
h08{2020}	0.826605	0.837105	0.826605	0.827107

<i>DUMs/ Year</i>	<b>DEA Model 1.3</b>	<b>DEA Model 2.3</b>	<b>DEA Model 1.4</b>	<b>DEA Model 2.4</b>
h08{2021}	0.874247	0.875449	0.874247	0.887297
h09{2019}	0.899784	0.983702	0.899784	0.979073
h09{2020}	0.830653	0.928149	0.830653	0.900271
h09{2021}	0.820489	0.910703	0.820489	0.885178
h10{2019}	0.725092	0.726951	0.725092	0.793836
h10{2020}	0.647259	0.657101	0.647259	0.687582
h10{2021}	0.657348	0.66131	0.657348	0.754157
h11{2019}	0.82825	0.849973	0.82825	0.832174
h11{2020}	0.647889	0.667548	0.647889	0.653454
h11{2021}	0.799116	0.805866	0.799116	0.799823
h12{2019}	0.908395	0.963773	0.908395	0.956048
h12{2020}	1	1	1	1
h12{2021}	0.884637	0.94104	0.884637	0.928392
h13{2019}	1	1	1	1
h13{2020}	1	1	1	1
h13{2021}	0.989287	0.989549	0.989287	0.989834
h14{2019}	1	1	1	1
h14{2020}	1	1	1	1
h14{2021}	0.95391	0.958868	0.95391	0.966118
h15{2019}	0.981542	1	0.981542	1
h15{2020}	0.649856	0.712059	0.649856	0.667811
h15{2021}	0.996597	1	0.996597	1
h16{2019}	1	1	1	1
h16{2020}	1	1	1	1
h16{2021}	1	1	1	1
h17{2019}	0.869969	0.894484	0.869969	0.872065
h17{2020}	0.854109	0.914425	0.854109	0.891402
h17{2021}	0.830613	0.846327	0.830613	0.861021
h18{2019}	0.84837	0.927865	0.84837	0.901806
h18{2020}	0.505076	0.675679	0.505076	0.536613
h18{2021}	0.745298	0.820859	0.745298	0.761212
h19{2019}	1	1	1	1
h19{2020}	0.754592	0.907765	0.754592	0.780189

<i>DUMs/ Year</i>	<b>DEA Model 1.3</b>	<b>DEA Model 2.3</b>	<b>DEA Model 1.4</b>	<b>DEA Model 2.4</b>
h19{2021}	0.998363	1	0.998363	1
h20{2019}	0.653097	0.834907	0.653097	0.714997
h20{2020}	0.49243	0.720079	0.49243	0.57118
h20{2021}	0.608575	0.776038	0.608575	0.677501
h21{2019}	0.908084	0.970963	0.908084	0.956366
h21{2020}	0.819454	1	0.819454	1
h21{2021}	0.870786	0.964495	0.870786	0.955541
h22{2019}	0.928	1	0.928	1
h22{2020}	0.587033	0.719713	0.587033	0.61415
h22{2021}	0.6813	0.794332	0.6813	0.724932
h23{2019}	0.712707	0.887551	0.712707	0.814823
h23{2020}	0.753222	0.939828	0.753222	0.889304
h23{2021}	0.725348	0.876461	0.725348	0.81492
h24{2019}	1	1	1	1
h24{2020}	0.989099	1	0.989099	1
h24{2021}	0.925123	0.935562	0.925123	0.925296
h25{2019}	0.827347	1	0.827347	1
h25{2020}	0.52642	0.832371	0.52642	0.658448
h25{2021}	0.791921	0.957364	0.791921	0.937512
h26{2019}	0.746889	0.931869	0.746889	0.90756
h26{2020}	0.659482	0.858442	0.659482	0.807339
h26{2021}	0.663369	0.839494	0.663369	0.789381
h27{2019}	0.623529	1	0.623529	1
h27{2020}	0.69416	1	0.69416	1
h27{2021}	0.640971	0.970244	0.640971	0.924598

*Note: DEA Model 1.3 (Non-Adjusted CRS input Model); DEA Model 2.3(Non-Adjusted VRS input Model); DEA Model 1.4 (Non-Adjusted CRS output Model); DEA Model 2.4 (Non-Adjusted VRS output Model).*

In the next table (Table 4-44), we present the results of the first stage DEA but after excluding outliers via superefficiency for the four calculated models (i.e., CRS input model, CRS output model, input VRS model, VRS output model), noting that [*DEA Model 1.1 (Adjusted input CRS Model); DEA Model 2.1 (Adjusted input VRS Model); DEA*



*Model 1.2 (Adjusted output CRS Model); DEA Model 2.2 (Adjusted output VRS Model)].*

**Table 4-44: First stage DEA results after excluding outliers**

<i>DUMs/ Year</i>	DEA 1.1	Model 2.1	DEA 1.2	Model 2.2
h01{2019}	1	1	1	1
h01{2020}	0.886614	0.952412	0.900925	0.997124
h01{2021}	0.903328	1	0.930736	1
h02{2019}	1	1	1	1
h02{2020}	0.761169	0.863267	0.764474	1
h02{2021}	0.874233	0.902325	0.924995	0.988213
h03{2019}	1	1	1	1
h03{2020}	1	1	1	1
h03{2021}	1	1	1	1
h04{2019}	1	1	1	1
h04{2020}	0.757121	0.770945	0.756272	0.757364
h04{2021}	1	1	1	1
h05{2019}	1	1	1	1
h05{2020}	0.642744	0.684146	0.639495	0.641291
h05{2021}	0.813537	0.825997	0.80829	0.81011
h06{2019}	1	1	0.938282	0.945331
h06{2020}	0.465234	0.466751	0.436778	0.469341
h06{2021}	0.515375	0.533416	0.501328	0.587342
h07{2019}	0.82512	0.867428	0.82512	0.84333
h07{2020}	0.821658	0.833972	0.821658	0.82599
h07{2021}	0.809669	1	0.809669	0.812127
h08{2019}	0.83661	1	0.83661	0.839032
h08{2020}	0.914786	0.834384	1	0.914729
h08{2021}	0.903066	0.849879	0.912757	0.979073
h09{2019}	0.830653	0.91521	0.903066	0.937828
h09{2020}	0.820489	0.960425	0.830653	0.88573
h09{2021}	0.749015	0.926439	0.820489	0.814001
h10{2019}	0.647259	0.772019	0.725092	0.710558
h10{2020}	0.679166	0.659146	0.647259	0.784727



<i>DUMs/ Year</i>	<b>DEA 1.1</b>	<b>Model 2.1</b>	<b>DEA 1.2</b>	<b>Model 2.2</b>
h10{2021}	0.837849	0.707055	0.657348	0.839941
h11{2019}	0.655598	0.864607	0.836129	0.660344
h11{2020}	0.799603	0.677164	0.650407	0.800414
h11{2021}	0.908395	0.812133	0.799457	0.956048
h12{2019}	1	0.963773	0.908395	1
h12{2020}	0.884637	1	1	0.928438
h12{2021}	1	0.942873	0.884637	1
h13{2019}	1	1	1	1
h13{2020}	0.989287	1	1	0.998516
h13{2021}	1	0.989549	0.990024	1
h14{2019}	1	1	1	1
h14{2020}	0.95391	1	1	0.966118
h14{2021}	0.982907	0.959712	0.953974	1
h15{2019}	0.70647	1	0.982907	0.723021
h15{2020}	0.996597	0.738338	0.70647	1
h15{2021}	1	1	0.996597	1
h16{2019}	1	1	1	1
h16{2020}	1	1	1	1
h16{2021}	1	1	1	1
h17{2019}	1	1	1	1
h17{2020}	0.962431	1	1	0.978375
h17{2021}	0.84837	0.969052	0.962431	0.908773
h18{2019}	0.505076	0.956743	0.84837	0.536613
h18{2020}	0.745298	0.71748	0.505764	0.7619
h18{2021}	1	0.834063	0.745298	1
h19{2019}	0.763045	1	1	0.780189
h19{2020}	1	0.934343	0.762971	1
h19{2021}	0.668236	1	1	0.780401
h20{2019}	0.494984	0.876464	0.668236	0.598648
h20{2020}	0.609827	0.775803	0.494984	0.693281
h20{2021}	0.961354	0.817138	0.609827	0.997575
h21{2019}	0.877723	0.999356	0.961354	1
h21{2020}	0.904422	1	0.821187	0.971071

<i>DUMs/ Year</i>	<b>DEA 1.1</b>	<b>Model 2.1</b>	<b>DEA 1.2</b>	<b>Model 2.2</b>
h21{2021}	0.930385	0.981312	0.878637	1
h22{2019}	0.588668	1	0.930385	0.61415
h22{2020}	0.682094	0.741864	0.588668	0.724932
h22{2021}	0.726131	0.80814	0.682094	0.831045
h23{2019}	0.791207	0.934909	0.726131	0.925754
h23{2020}	0.736835	0.986473	0.791207	0.828466
h23{2021}	1	0.919185	0.736835	1
h24{2019}	1	1	1	1
h24{2020}	1	1	1	1
h24{2021}	0.828401	1	1	1
h25{2019}	0.52712	1	0.828401	1
h25{2020}	0.792459	0.89849	0.52712	0.691902
h25{2021}	0.79104	0.971942	0.792459	0.937512
h26{2019}	0.79104	1	0.762227	0.934742
h26{2020}	0.69512	0.945086	0.665707	0.822857
h26{2021}	0.701401	0.904231	0.668979	0.803032
h27{2019}	1	1	0.629127	1
h27{2020}	0.76489	1	0.76489	1
h27{2021}	0.706282	0.971104	0.706282	0.933618

*Note: DEA Model 1.1 (Adjusted input CRS Model); DEA Model 2.1 (Adjusted input VRS Model); DEA Model 1.2 (Adjusted output CRS Model); DEA Model 2.2 (Adjusted output VRS Model).*

In the following table, we present the values of the Superefficiency test to exclude outliers from all the calculated DEA models, taking the [Banker and Chang’s \(2006\)](#) threshold of (1.2). It is clear that the [h24{2019}; h16 {2020}] are excluded from the data in all the four calculated DEA models. The outliers seem to be more in the VRS models than the CRS models. In fact, outliers in VRS were 6 in the input models, and 5 in the output models.

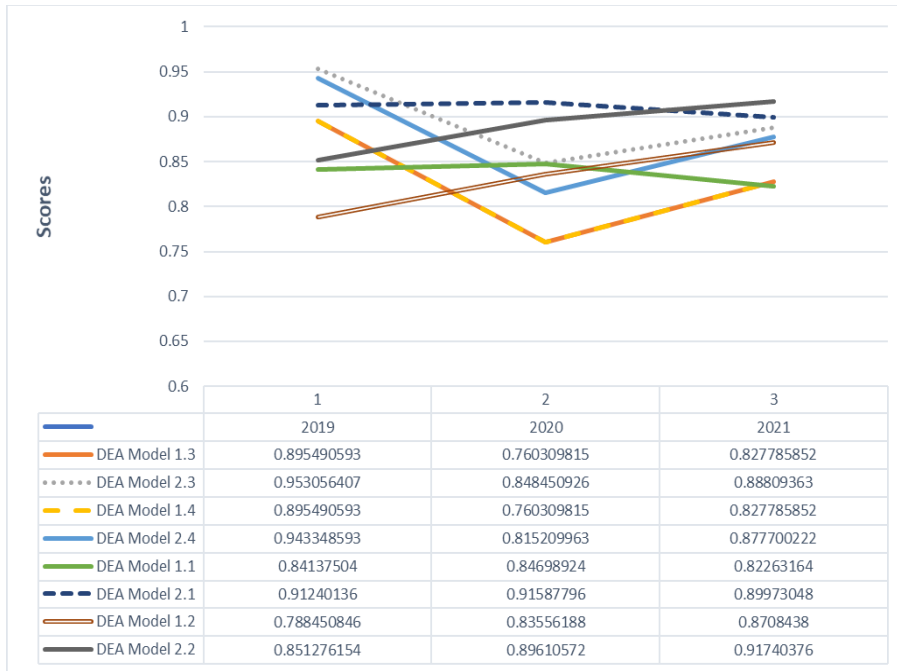
Table 4-45: First stage DEA results after excluding outliers

Outliers using Super-Efficiency			
Model Orientation	Year		
	2019	2020	2021
<i>Input-oriented models</i>			
<i>CCR</i>	h24{2019} 1,204224	h16{2020} 1.232273	
<i>VRC</i>	h08{2019} 1,265571 h24{2019} 1,305109 h27{2019} 1,352941	h03{2020} 1,578011 h16{2020} 1,267929	h03{2021} 1,502802
<i>Output-oriented models</i>			
<i>CCR</i>	h24{2019} 1,204224	h16{2020} 1,232273	
<i>VRC</i>	h01{2019}1,385656 h08{2019}1,214223 h24{2019}1,352750	h14{2020} 2,367604 h16{2020} 1,527799	

In the next figure (Figure 4-12), we calculated the means of the efficiency scores results from the first stage DEA for all the adjusted and non-adjusted CRS and VRS input and output models. Generally, the averages of means scores were high for the three years (0.76-0.95).

Additionally, it can be seen that VRS models appear to be higher in both adjusted and non-adjusted terms, while the CRS models tend to be lesser but with a very small margin and very close to 0.9. Also, we can see that in the year 2020 there was a significant decrease in non-adjusted CRS and VRS output models in specific in the whole year of 2019 and 2020 in general. Indeed, this drop could be corresponded to the pandemic of COVID -19, which affected most of the health sector entities.

Figure 4-12: Efficiency scores in terms of means by years



**Note:** DEA Model 1.1 (Adjusted input CRS Model); DEA Model 2.1 (Adjusted input VRS Model); DEA Model 1.2 (Adjusted output CRS Model); DEA Model 2.2; (Adjusted output VRS Model); DEA Model 1.3 (Non-Adjusted CRS input Model); DEA Model 2.3 (Non-Adjusted VRS input Model); DEA Model 1.4 (Non-Adjusted CRS output Model); DEA Model 2.4 (Non-Adjusted VRS output Model).

**Source:** own elaboration

The next table (Table 4-46) shows the Spearman correlations between DEA models and PSM. The results indicate that there is a positive correlation between the adjusted input CRS DEA model (i.e., DEA Model 1.1) and the adjusted<sup>14</sup> VRS input DEA model (i.e., DEA Model 2.1), ( $r = 0.48, p = .000$ ), and also found that there is a moderate positive correlation between the adjusted output CRS DEA model (i.e.,

<sup>14</sup> Adjusted models are the DEA models after excluding outliers via superefficiency test in MaxDEA Ultra Software



DEA Model 1.2) with the adjusted VRS output DEA model (i.e., DEA Model 2.2,  $r = 0.53$ ,  $p = .000$ ).

On the other hand, we found that there is a positive strong correlation between the non-adjusted input CRS DEA model (i.e., DEA Model 1.3) and the non-adjusted input VRS DEA model (i.e., DEA Model 2.3), ( $r = 0.82$ ,  $p = .000$ ), also, the results indicate that the correlation between the non-adjusted output CRS DEA model (i.e., DEA Model 1.4) and non-adjusted output VRS DEA model (i.e., DEA Model 2.4), is strongly correlated ( $r = 0.85$ ,  $p = .000$ ). We can see that the previous results indicate very similar results between the adjusted and non-adjusted DEA models.

The results of the Spearman correlation also revealed that there is a positive moderate association between the adjusted input CRS DEA model and the non-adjusted input CRS DEA model ( $r = 0.59$ ,  $p = .000$ ), and a very strong correlation between the adjusted output CRS DEA model and the non-adjusted output CRS DEA model ( $r = 0.94$ ,  $p = .000$ ). In a similar value, the correlation between the adjusted output CRS DEA model and the non-adjusted input CRS DEA model ( $r = 0.94$ ,  $p = .000$ ).

Nevertheless, we also found that there is a strong correlation between the adjusted input VRS DEA model and the non-adjusted input VRS DEA model ( $r = 0.90$ ,  $p = .000$ ), and we found that the correlation between the adjusted output VRS DEA model and the non-adjusted output VRS DEA model is moderately and positively correlated ( $r = 0.56$ ,  $p = .000$ ).

The results showed that there is a very strong correlation between the non-adjusted input VRS DEA model and with non-adjusted output VRS DEA model ( $r = 0.98$ ,  $p = 0.000$ ), and we found that there is a perfect positive correlation between the non-adjusted input CRS DEA model and the non-adjusted output CRS DEA model ( $r = 1.0$ ,  $p = 0.000$ ), in which the change in the value of one of these models is exactly proportional to the change in the value of the other model.

A Spearman correlation coefficient was computed to assess the relationship between a PSM and adjusted/non-adjusted DEA models. In general, despite the mixed results between positive and negative correlations, the results indicate a very weak association between PSM

and DEA models; however, the relationship was not significant where the p-value ranged between (0.35 to 0.99), and the correlation coefficient ranged between  $r$  (-0.06 to 0.05). The PSM did not appear to be associated with any of the DEA models in this study. In general, we can indicate from these results that the appropriateness of CRS models, to be adopted in this study.

Table 4-46: Spearman correlations between DEA models and PSM

	DEA Model 1.1	DEA Model 2.1	DEA Model 1.2	DEA Model 2.2	DEA Model 1.3	DEA Model 2.3	DEA Model 1.4	DEA Model 2.4	PSM
<b>DEA Model 1.1</b>	1.000								
<i>P</i>	-----								
<b>DEA Model 2.1</b>	0.484	1.000							
<i>P</i>	0.000	-----							
<b>DEA Model 1.2</b>	0.602	0.762	1.000						
<i>P</i>	0.000	0.000	-----						
<b>DEA Model 2.2</b>	0.839	0.524	0.539	1.000					
<i>P</i>	0.000	0.000	0.000	-----					
<b>DEA Model 1.3</b>	0.594	0.762	0.944	0.519	1.000				
<i>P</i>	0.000	0.000	0.000	0.000	-----				
<b>DEA Model 2.3</b>	0.487	0.903	0.751	0.562	0.816	1.000			
<i>P</i>	0.000	0.000	0.000	0.000	0.000	-----			
<b>DEA Model 1.4</b>	0.594	0.762	0.944	0.519	1.000	0.816	1.000		
<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	-----		
<b>DEA Model 2.4</b>	0.493	0.886	0.790	0.565	0.851	0.982	0.851	1.000	
<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-----	
<b>PSM</b>	-0.080	0.014	-0.104	-0.064	-0.102	0.053	-0.102	0.000	1.000
<i>P</i>	0.472	0.898	0.355	0.567	0.360	0.632	0.360	0.996	-----

*Note:* DEA Model 1.1 (Adjusted input CRS Model); DEA Model 2.1 (Adjusted input VRS Model); DEA Model 1.2 (Adjusted output CRS Model); DEA Model 2.2; (Adjusted output VRS Model); DEA Model 1.3 (Non-Adjusted CRS input Model); DEA Model 2.3(Non-Adjusted VRS input Model); DEA Model 1.4 (Non-Adjusted CRS output Model); DEA Model 2.4 (Non-Adjusted VRS output Model).



In the next table (Table 4-47), we calculate the correlations between the explanatory variables and the adjusted DEA models that are included in the second stage DEA, using simple linear regression. Given the fact that the nature of these variables is categorical variables. Additionally, to see which explanatory variables appear as significant affecting efficiency in simple regression.

The result shows that the variable *H SIZE* (i.e., Hospital Size), is positively associated with input and output oriented CRS models. On contrary, the variable *H SIZE* was found to be negatively associated with VRS models. The variable *TERRITOIES*, shows a negative association with all the four DEA models, which may indicate that the more we go to the south the less is the efficiency. Also, the t-statistics were higher in the case of CRS models, especially input oriented CRS model, but with negative signs in all the models also.

Regarding the variable *EDUC*, it only shows moderate t statistics for the CRS models, and within this category the sign of beta coefficient and even the size of beta are consistent. However, in the VRS models, it was found to be negatively associated with the input VRS model, and positively associated with the output VRS model, with quite similar beta coefficient but with deferent signs. In the case of the *JCIAO* variable, the results shows that it is positively related to DEA models in this study, but only for the input VRS model it was negative. However, the t statistics were very weak.

Lastly, in the case of the variable *TECH* shows similar association to *JCIAO*, where it was positively corelated with all the DEA models unless the input VRS model. The beta coefficients are relatively weak, but they are higher in the CRS models.

Table 4-47: Simple regression correlations between adjusted DEA scores and categorical variables

Adjusted input CRS Model				Adjusted input VRS Model		
Variable	Coefficient	SE	<i>Prob(t-Statistic)</i>	Coefficient	SE	<i>Prob(t-Statistic)</i>
HSIZE	0.019136	0.036066	0.530578	-0.057092	0.027276	-2.093115
Territories	-0.059356	0.021744	-2.729781	-0.039634	0.017069	-2.322036
EDUC	0.062138	0.035092	1.770718	-0.003439	0.027749	-0.123932
JCIAO	0.030946	0.047354	0.653508	-0.022713	0.036737	-0.618249
TECH	0.039030	0.033472	1.166072	-0.021320	0.026072	-0.817736
Adjusted output CRS Model				Adjusted output VRS Model		
HSIZE	0.037129	0.458152	0.017011	-0.000680	0.032245	-0.021079
Territories	-0.086331	0.021295	-4.054049	-0.039260	0.019814	-1.981481
EDUC	0.078636	0.035740	2.200208	0.021416	0.031843	0.672572
JCIAO	0.024075	0.048783	0.493519	0.050143	0.041998	1.193925
TECH	0.025296	0.034620	0.730652	0.016126	0.030073	0.536232
Num.obs	81	81	81	81	81	81

Note: Tested via Panel Least Squares

Variable return to scale (VRS) models are considered the most used in healthcare literature and they argue that it is more adaptive and better to work with, empirically (Kohl, et al., 2019). Additionally, VRS demand less requirements than CRS DEA models. Based in the beforementioned, and due this uncertainty it is worth checking the suitability of the models for our data. For this aim, we used the proposition of Fukushige and Miyara (2005) test of returns to scale via the association between the means of DEA scores using equality of scores means or sign test, which is very sensitive to outliers.

However, after calculating the efficiency score from hospitals as the first step, we checked the hypothesis of *Fukushige and Miyara* test using the following equation:

$$H_0: \bar{\theta}^{IRS} = \bar{\theta}^{DRS} \text{ vs. } H_1: \bar{\theta}^{IRS} > \bar{\theta}^{DRS}$$

The test statistics is:

$$z_1 = \frac{\Delta}{\sqrt{\frac{S_{IRS}^2}{n} + \frac{S_{DRS}^2}{n}}}$$

Where the numerator of the test (i.e.,  $\Delta \equiv \bar{\theta}^{IRS} - \bar{\theta}^{DRS}$ ), represent the difference between the means of each DEA model that inserted in the equation. In the other hand, the denominator represents the square root of quotient between variances of each model and the number of observations in the sample, also,  $S$  represent  $SD$  and  $n$  represent the number of observations. However, Fukushige and Miyara put a rule of thumb for this test, which is (1.645)<sup>15</sup>. If the test statistics is greater than the threshold, we reject the null hypothesis, then we accept the alternative hypothesis, which is -increasing returns to scale.

In our case we tested all the DEA models that we have (i.e., adjusted and non-adjusted) with both orientations (i.e., input and output) as it shows in Table 4-48. We can see that all the values of the

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<sup>15</sup> This value is the upper 5% critical value from the standard normal distribution.

test are greater than the value (1.645) which indicates refusing the null hypothesis and accepting the alternative hypothesis.

**Table 4-48: Fukushige & Miyara VRS test**

DEA Model 1.1 VS. DEA Model 2.1	DEA Model 1.2 VS. DEA Model 2.2
$z = \frac{X_1 - X_2}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$ $= \frac{0.9163 - 0.8465}{\sqrt{0.117^2/81 + 0.1509^2/81}}$ $= 3.289$	$z = \frac{X_1 - X_2}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$ $= \frac{0.8947 - 0.8415}{\sqrt{0.1346^2/81 + 0.1552^2/81}}$ $= 2.331$
DEA Model 1.3 VS. DEA Model 2.3	DEA Model 1.4 VS. DEA Model 2.4
$z = \frac{X_1 - X_2}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$ $= \frac{0.8965 - 0.8279}{\sqrt{0.1225^2/81 + 0.1533^2/81}}$ $= 3.149$	$z = \frac{X_1 - X_2}{\sqrt{\sigma_1^2/n_1 + \sigma_2^2/n_2}}$ $= \frac{0.8788 - 0.8279}{\sqrt{0.1359^2/81 + 0.1533^2/81}}$ $= 2.236$
<p><i>Note:</i> DEA Model 1.1 (Adjusted input CRS Model); DEA Model 2.1 (Adjusted input VRS Model); DEA Model 1.2 (Adjusted output CRS Model); DEA Model 2.2; (Adjusted output VRS Model); DEA Model 1.3 (Non-Adjusted CRS input Model); DEA Model 2.3(Non-Adjusted VRS input Model); DEA Model 1.4 (Non-Adjusted CRS output Model); DEA Model 2.4 (Non-Adjusted VRS output Model).</p>	

### 4.2.2 Data envelopment Analysis Second stage

To perform the DEA second stage, we have to deal with the limitations arising from the relatively low number of non-military public hospitals existing in Jordan and the strictly cross-sectional nature of our PSM data. On the plausible assumption that these data can be extrapolated to the year before and the year after their collection, a way

is paved to triplicate the observations by exploiting the same three-year window that was already used in the first stage of our DEA. This supposes, however, to consider PSM as a time-invariant variable and prevents its entering into fixed-effects models, given the fact that PSM is considered a stable property (like a trait), and it only changes slowly after time, and after intense experiences, with attribution to the *attraction–selection mechanism* (Brænder & Anderson, 2013; Kjeldsen, 2014; Wright & Christensen, 2021). In line with what has been stated before, Vogel and Kroll (2016) who studied PSM using a panel study that spanned for 16 years, found that the PSM of public workers is stable, rather than dynamic. Echoing a similar opinion, Wright and Grant (2010) studied the stable nature of PSM, where they argued that PSM is stable, or is rather difficult or slow to change over time for public sector employees.

However, to overcome this obstacle and obtain beta coefficients for PSM and its dimensions, we will resort to two different kinds of models: the so-called hybrid or Within-Between (WB) models and the Fixed-Effects Filtered (FEF) models.

#### 4.2.2.1 Within-between models

##### 4.2.2.1.1 Within-between models with PSM

The results for the WB models with PSM as an explanatory variable are depicted in Table 4-49. Our time-varying variables unless *TIME* and *COVID19* are broken down into two: their hospital-specific means and their hospital-specific demeaned values<sup>16</sup>. Beta coefficients for both kinds of variables express the between and within effects, respectively. In the case of *TIME* and *COVID19*, the hospital-specific

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<sup>16</sup> In the variable *TERRITORIES*, there is only a time variation in the observation for h20 in year 2021 (it passed from the Central Government to the Northern Government). In *H SIZE*, there are only time variations in the observations for h11 and h13 in year 2021 (both became large hospitals by exceeding the 130-bed threshold). In view of this, we chose to treat these variables as time invariant so as not to “load” the models with two additional parameters.

means are not entered into the models because all the means are the same, since both variables are invariant in the cross-section.

The models for input-oriented efficiency scores show a substantially better fitting (higher  $R^2$ ) and higher joint significance ( $p$ -values  $< 0.05$  for the  $F$  statistic). These models explain around a quarter of the total variance in efficiency scores. From the models for output-oriented efficiency scores, only the one without  $HSIZE$  and  $URBAN\_RURAL$  has a  $p$ -value  $< 0.1$  for the  $F$  statistic, with a determination coefficient of 16.7%.

An increase in the proportion of refugees living in the *gouvernante* (i.e., the province) where a hospital operates tends to increase efficiency in the hospital. In the model for input-oriented efficiency scores without  $HSIZE$  and  $URBAN\_RURAL$ , the proportion of refugees has also a positive impact on efficiency in the cross section, at a significance level of 5%. In the rest of the models, the beta coefficients for  $REFP\_MEAN$  are also positive, albeit they do not reach the usual significance thresholds. It might be the case that a greater proportion of refugees supposes a greater demand for healthcare without an accordingly greater endowment of inputs. In our framework, this leads to greater efficiency. It moreover makes sense that the within effect is stronger than the between one, given that the former may reflect more directly the resistance to alter the *statu quo* (i.e., endowment of inputs) in response to an increasing proportion of refugees. Equally understandable is that the within effect is more intense on the output-oriented efficiency scores, as an effort is done to get a greater output from the inputs to respond to the demand of a growing mass of refugees.

The Covid-19 pandemic has had a negative effect on efficiency, statistically significant at the 1% level in the four models. A possible explanation might lie in sick leave of healthcare personnel in Jordan's non-military public hospitals due to the Covid-19 disease, as employees on leave may be difficult to replace and the input mix may, therefore, move away even more from its optimum. An alternative or complementary explanation might be the disincentive to go to a hospital to demand care when the hospital is full of infectious, Covid-19 patients and relatively empty of nurses and doctors.

Regarding the average length of stay (*ALOS*), it shows a negative within effect together with a positive between effect. The first effect is significant at the 10% level for the input-oriented efficiency when *H SIZE* and *URBAN\_RURAL* are dropped from the model, but it is greater and significant at the 1% level in the estimates for output-oriented efficiency. An increase in the average length of stay tends therefore to cause a decrease in efficiency, especially in output-oriented efficiency. It makes sense because a rising length of stay implies a decreasing number of patients receiving care, *ceteris paribus*. More intriguing is the second effect, which supposes that those hospitals with higher means in length of stay tend to be also more efficient. This might mean that, in the cross section, the average length of stay is associated to hospital structural features that propitiate or favour efficiency (for instance, a technical capacity and capital stock that enable the hospital to treat severe illnesses with longer lengths of stay, but also enable it to treat more efficiently less severe illnesses).

The time-counter variable is found to positively affect efficiency, although this effect is statistically significant (at the 1% level) only in the estimates for output-oriented efficiency. There has been, therefore, a positive trend for this kind of efficiency in the period 2019-21. The rest of our explanatory variables do not affect efficiency at the conventional significance levels. *PSM* exhibits, however, negative beta coefficients in the four models. Despite its lack of statistical significance, this result invites us to consider the possible trade-offs between our limited measure of productive efficiency and other performance dimensions that may be relevant from a *PSM* perspective (equity, quality of care, fairness, transparency...).

Table 4-49: Within-between models with PSM as an explanatory variable

	Dependent variable			
	input-efficiency		output-efficiency	
<b>C</b>	0.857840***	0.886353***	1.030075***	1.011687***
<i>SE</i>	(0.109506)	(0.121578)	(0.037338)	(0.082426)
<b>ALOS_DEMEANED</b>	-0.024049	-0.025050*	-0.076948***	-0.077251***
<i>SE</i>	(0.023933)	(0.014524)	(0.024346)	(0.021843)
<b>REFP_DEMEANED</b>	1.62E-05***	1.62E-05**	3.03E-05**	3.02E-05**
<i>SE</i>	(5.48E-06)	(6.25E-06)	(1.43E-05)	(1.41E-05)
<b>TIME_DEMEANED</b>	0.025267	0.025910	0.051474***	0.051867***
<i>SE</i>	(0.017555)	(0.017428)	(0.003840)	(0.001402)
<b>COVID19_DEMEANED</b>	-0.124584***	-0.124641***	-0.104390***	-0.104119***
<i>SE</i>	(0.042198)	(0.044397)	(0.0185012)	(0.017143)
<b>ALOS_MEAN</b>	0.035047*	0.031233	0.025333	0.029433**
<i>SE</i>	(0.018942)	(0.018821)	(0.016931)	(0.013530)
<b>REFP_MEAN</b>	3.27E-07	2.95E-07**	8.56E-08	1.28E-07
<i>SE</i>	(2.48E-07)	(1.13E-07)	(3.37E-07)	(1.92E-07)
<b>PSM</b>	-1.78E-05	-6.66E-05	-0.000168	-0.000163
<i>SE</i>	(7.94E-05)	(9.18E-05)	(0.000125)	(0.000154)
<b>HSIZE</b>	-0.046609	-0.058086	0.010961	
<i>SE</i>	(0.039573)		(0.035834)	
<b>URBAN_RURAL</b>	-0.032808		0.011782	
<i>SE</i>	(0.039850)		(0.059996)	
<b>TERRITORIES</b>	-0.012444		-0.035732	-0.032117
<i>SE</i>	(0.01411)		(0.052143)	(0.038770)
<b>R-squared</b>	0.262757	0.249790	0.171307	0.167498
<b>Adjusted R squared</b>	0.157437	0.166433	0.052922	0.074998
<b>F-statistic</b>	2.494838	2.996635	1.447035	1.810783
<b>Prob(F-statistic)</b>	0.012705	0.005876	0.178392	0.088955
<b>Num.obs.</b>	81	81	81	81

*Note:* (1) Efficiency scores from a DEA model with variable returns of scale. (2) The scores were calculated from the sample without outliers, albeit these were then entered into the regression models with a score of 1. (3) Models estimated via panel EGLS (cross-section random effects), with the Swamy and Arora estimator of component variances. (4) In parenthesis, White cross-section standard errors (d.f. corrected). (5) The included model indicators are weighted statistics. (6) \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

#### 4.2.2.1.2 Within-between models with PSM dimensions

The results for the WB models with PSM dimensions (together or one by one) as explanatory variables for input efficiency are illustrated in Table 4-50. By the same token, our time-varying variables have the



same conditions as in the previous model (Table 4-49). Beta coefficients for their means and for their demeaned values express the between and within effects, respectively.

Compared with the models of the previous subsection, the models of input-oriented efficiency with PSM dimensions show a substantially similar fitting and higher joint significance. These models explain around a quarter of the total variance in efficiency scores, in accordance with the previous WB input efficiency models (Table 4-48). The results show that the increase of the ratio of refugees living in the *gouvemante* where hospital operates, tends to increase the efficiency in the hospital. Moreover, the beta coefficients for *REFP\_MEAN* are positive, and they have statistically significant association with input efficiency unless one of them with  $\beta=2.36E-07$ . This could be due the fact that an increasing ratio of refugees tends to suppose an increasing demand for healthcare without greater endowment of inputs. Echoing the same opinion in the first WB model (Table 4-48), this results in our framework will lead to greater efficiency.

Regarding the pandemic of Covid-19, it also had a negative influence on efficiency scores within this model. The influence on input efficiency is statistically significant at the alpha level of 1% in all the four models unless the last one (significant at the 5% level). As we explained previously, in this case we may attribute the effect to the absence of the healthcare labour because of the Covid-19 pandemic, which casted a heavy shadow in the hospitals' input mix to move to its optimum capacity. Additionally, it is worth mentioning the probability of getting infected, since the public hospitals were considered the epicentre of the disease.

Concerning the variable *ALOS*, it shows a negative within effect together with a positive between effect. The first effect was significant at the alpha level of 1% in the first and the last models, while the second effect was significant only in the first model, at a 5% significance level. As indicated previously, an increase in the *ALOS* have a tendency to consequently cause a decrease in efficiency. It makes sense because a rising length of stay implies a decreasing number of patients receiving care, *ceteris paribus*. The second effect, which here appears doubtful, might mean that, in the cross section, the average length of stay is

associated to hospital structural features that propitiate or favour efficiency.

The rest of our explanatory variables do not affect efficiency at the conventional significance levels. In the case of the time-counter variable, it seems to be like a sort of a pattern that it is insignificant within input efficiency models in the period 2019-21. Regarding the PSM dimensions, they only appear as significant (at the alpha level of 1%) in the first model<sup>17</sup>, in which only *SS* has a positive beta coefficient, while the rest of dimensions show negative coefficients.

**Table 4-50: Within-between models for input efficiency with PSM dimensions as explanatory variables**

<b>Dependent variable: input efficiency</b>				
<b>C</b>	1.008426***	0.919680***	0.864413***	0.787375***
<i>SE</i>	(0.094557)	(0.087799)	(0.099078)	(0.156369)
<b>ALOS_DEMEANED</b>	-0.025609***	-0.023768	-0.024373	-0.024105***
<i>SE</i>	(0.008000)	(0.022606)	(0.019929)	(0.020336)
<b>REFP_DEMEANED</b>	1.70E-05***	1.61E-05**	1.59E-05**	1.59E-05*
<i>SE</i>	(4.49E-06)	(6.10E-06)	(6.58E-06)	(6.84E-06)
<b>TIME_DEMEANED</b>	0.023541	0.025658	0.024599	0.024974
<i>SE</i>	(0.014582)	(0.017468)	(0.018085)	(0.018985)
<b>COVID19_DEMEANED</b>	-0.124949***	-0.124983***	-0.122863***	-0.123399**
<i>SE</i>	(0.039780)	(0.042528)	(0.044852)	(0.046702)
<b>ALOS_MEAN</b>	0.026826**	0.031086	0.029646	0.029330
<i>SE</i>	(0.011657)	(0.019216)	(0.019340)	(0.019671)
<b>REFP_MEAN</b>	3.92E-07***	2.88E-07**	2.36E-07	2.43E-07*
<i>SE</i>	(1.19E-07)	(1.73E-07)	(1.54E-07)	(1.42E-07)
<b>APS</b>	-0.001273***	-0.000277		
<i>SE</i>	(7.75E-05)	(0.000254)		
<b>SS</b>	0.001406***		-2.72E-05	
<i>SE</i>	(0.000298)		(0.000334)	
<b>CPV</b>	-0.000745***			0.000288
<i>SE</i>	(0.000125)			(0.000366)
<b>R-squared</b>	0.246706	0.260431	0.254764	0.256587
<b>Adjusted R squared</b>	0.151218	0.166683	0.160298	0.162352
<b>F-statistic</b>	2.583636	2.777984	2.696871	2.722836
<b>Prob(F-statistic)</b>	0.012342	0.007595	0.009303	0.008718
<b>Num.obs.</b>	81	81	81	81

*Note:* (1) Efficiency scores from a DEA model with variable returns of scale. (2) The scores were calculated from the sample without outliers, albeit these were then entered into the regression models with a score of 1. (3) Although the results in the last three columns were obtained including *H SIZE* and *TERRITOIRES* among the regressors, both variables were statistically insignificant and their estimates were removed from the table. (4) Models estimated via panel EGLS (cross-section random effects), with the Swamy and Arora estimator of component variances. (5) In parenthesis, White cross-section standard errors (d.f. corrected). (6) The included model indicators are weighted statistics. (7) \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1.

The results for the WB models with PSM dimensions (together or one by one) as explanatory variables for output efficiency are illustrated in Table 4-51. Similarly, our time-varying variables has the same conditions as in the previous WB models (Table 4-50). Beta coefficients for their means and for their demeaned values express the between and within effects, respectively.

The first model for output-oriented efficiency with PSM dimensions shows a noticeably inferior fitting, yet it is nonsignificant.



In contrary, the second, third, and fourth models were statistically significant. However, the significant models explain less than a quarter of the total variance of output efficiency scores. The results indicate the positive association between output efficiency scores and *REFP\_DEMEANED* and they are statistically significant in the first and fourth models at 5% alpha level, and in the second and third models at the 10% level. As regards the pandemic of Covid-19, it was found that it also had a negative influence on output efficiency within this model. In the next table, Covid-19 has statistically significant influence on output efficiency in all the four models at the alpha level of 1%. As we clarified formerly, in this case we, as well, attribute this effect to the absence of the healthcare labour because of the Covid-19 pandemic, and the serious circumstances that resulted from it.

The average length of stay (*ALOS*) within this model shows a total negative influence in output efficiency scores, at the alpha level of 1%. As we suggested earlier, an increase in the *ALOS* have a tendency to therefore cause a decrease in efficiency. It makes sense because a rising length of stay implies a decreasing number of patients receiving care, *ceteris paribus*. More intriguing is the second effect, which supposes that those hospitals with higher means in length of stay tend to be also more efficient. This might mean that, in the cross section, the average length of stay is associated to hospital structural features that propitiate or favour efficiency.

The time-counter variable was found to be statistically significant in all the models in table 4-51, at the alpha level of 1%. These results indicate a robustness in the case of output efficiency, being found that the beta for *TIME* is always significant in all the previous models with output efficiency scores, in the period 2019-21. Though, the rest of our explanatory variables do not affect efficiency at the conventional significance levels. In the case of PSM dimensions, only *APS* and *SS* found to be statistically significant in the first model, at the alpha level of 1%. On the other hand, in the rest of the other three models, only *APS* found to be statistically significant. Regarding the signs of the slope parameters, they are negative for all the dimensions unless the positive coefficient for *SS* in the first model.

**Table 4-51: Within-between models for output efficiency with PSM dimensions as explanatory variables**

Dependent variable: output efficiency				
<i>C</i>	1.094116***	0.958523***	0.901981***	0.921546***
<i>SE</i>	(0.331799)	(0.031774)	(0.046587)	(0.216437)
<i>ALOS_DEMEANED</i>	-0.078475***	-0.076763***	-0.077289***	-0.077548***
<i>SE</i>	(0.027578)	(0.021709)	(0.022686)	(0.024304)
<i>REFP_DEMEANED</i>	3.13E-05**	2.99E-05*	2.97E-05*	2.95E-05**
<i>SE</i>	(1.44E-05)	(1.40E-05)	(1.42E-05)	(1.39E-05)
<i>TIME_DEMEANED</i>	0.054350***	0.051127***	0.050264***	0.049875***
<i>SE</i>	(0.004963)	(0.001192)	(0.002233)	(0.002900)
<i>COVID19_DEMEANED</i>	-0.109158***	-0.102648***	-0.100675***	-0.099782***
<i>SE</i>	(0.016716)	(0.016653)	(0.018992)	(0.019436)
<i>ALOS_MEAN</i>	0.035968***	0.030314*	0.029240**	0.029910*
<i>SE</i>	(0.013116)	(0.013154)	(0.013452)	(0.012429)
<i>REFP_MEAN</i>	3.39E-07**	1.18E-07	5.94E-08	4.84E-08
<i>SE</i>	(1.60E-07)	(1.72E-07)	(1.80E-07)	(1.58E-07)
<i>APS</i>	-0.001420***	-0.000344*		
<i>SE</i>	(0.000206)	(0.000135)		
<i>SS</i>	0.001189***		-0.000101	
<i>SE</i>	(0.000192)		(0.000439)	
<i>CPV</i>	-0.000897			-0.000170
<i>SE</i>	(0.001100)			(0.001126)
<b><i>R-squared</i></b>	<b>0.168616</b>	<b>0.249790</b>	<b>0.182964</b>	<b>0.183124</b>
<b><i>Adjusted R squared</i></b>	<b>0.063229</b>	<b>0.166433</b>	<b>0.079396</b>	<b>0.079577</b>
<b><i>F-statistic</i></b>	<b>1.599969</b>	<b>2.996635</b>	<b>1.766612</b>	<b>1.768502</b>
<b><i>Prob(F-statistic)</i></b>	<b>0.131898</b>	<b>0.005876</b>	<b>0.090012</b>	<b>0.089617</b>
<b>Num.obs.</b>	<b>81</b>	<b>81</b>	<b>81</b>	<b>81</b>

*Note:* (1) Efficiency scores from a DEA model with variable returns of scale. (2) The scores were calculated from the sample without outliers, albeit these were then entered into the regression models with a score of 1. (3) Although the results in the last three columns were obtained including *H SIZE* and *TERRITOIRES* among the regressors, both variables were statistically insignificant and their estimates were removed from the table. (4) Models estimated via panel EGLS (cross-section random effects), with the Swamy and Arora estimator of component variances. (5) In parenthesis, White cross-section standard errors (d.f. corrected). (6) The included model indicators are weighted statistics. (7) \*\*\*p <0.01, \*\*p<0.05, \*p<0.1.

#### 4.2.2.2 Fixed-Effects Filtered models

The results for the FEF models with input efficiency as dependent variable are depicted in Table 4-51. In the FEF first stage, our time-varying variables are entered as regressors into a fixed-effects model<sup>18</sup>. The model fits reasonably well ( $R^2 = 0.88$ ), as can also be seen in Figure 4-13, and it shows a high joint significance ( $p$ -value  $< 0.00000$  for the  $F$  statistic). However, the individual significance tests only allow rejecting the null hypothesis for the variables *REFP*, *TIME* and *COVID19*.

An increase in the proportion of refugees living in the *gouvemante* where a hospital operates tends to increase efficiency in the hospital. This result seems to be even sounder in the FEF model than in the WB models of the table 4-49, since the former confirms a positive impact of *REFP* on efficiency at a significance level of 1%, a level achieved only in the first of the WB models. With the reinforced control provided by fixed-effects, it therefore becomes even more plausible our inference that a greater proportion of refugees supposes a greater demand of healthcare without an accordingly greater endowment of inputs.

The time-counter variable is found to positively affect efficiency at a significance level of 1%, whereas in the abovementioned WB models this significance level was reached only in the estimates for output efficiency. It is, therefore, corroborated the also positive trend for input efficiency in the period 2019-21. The same happens with the negative effect that *COVID19* has had on efficiency. This effect appears as especially robust, with an almost full coincidence between the WB and FEF models' estimates both in the beta size ( $-0.125$ ) and the statistical significance (1%). There is, therefore, an empirical basis to think that either the sick leave of healthcare personnel or the reluctance to go to hospitals due to the pandemic has pulsed down efficiency in Jordanian hospitals. The pictures arisen from the WB and FEF models are equally similar regarding the average length of stay (*ALOS*). Its FEF beta coefficient ( $-0.0194$ ) is rather close to the within coefficients ( $-0.024$

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<sup>18</sup> As in the WB models, the variables *TERRITORIES* and *H SIZE* are here treated as time invariant, since they have only time variation in one and two observations, respectively, in year 2021.

and  $-0.025$ ) of this variable in the WB models for input efficiency. Statistical significance is not achieved in any of them, unless at a 10% level in the WB model without *H SIZE* and *URBAN\_RURAL*. In sum, an increase in the average length of stay of a hospital tends to reduce its input efficiency, although this effect remains doubtful from the statistical-significance point of view.

In the FEF second stage, the models are able to explain around one third of the variance in input efficiency. Their joint significances achieve the 1% level when the Wald F-statistic is used, while they remain between the 5% (second model) and 10% (first, third and fourth models) levels if the F-statistic is chosen. Among the regressors, only *TERRITORIES* and *URBAN\_RURAL* have statistically significant effects on input efficiency. The more southern a hospital is, the more input efficient tends to be. This effect appears a bit greater and more significant when *PSM* or *SS* are included as explanatory variables than if the selected are *APS* or *CPV*.

Hospitals operating in urban areas are less input efficient, *ceteris paribus*. In the first three FEF models, the beta coefficients for this relationship are statistically significant at the 5% level. In the fourth model, a significance level of 1% is reached. The rest of our explanatory variables do not affect input efficiency at the conventional significance levels. *PSM* and its dimensions exhibit, however, negative beta coefficients unless in the case of commitment to public values, which has the coefficient closest to zero. Thus, our FEF-model results for public service motivation and its two first dimensions led us, again, to consider the possible trade-offs between input efficiency and other performance criteria more linked to *PSM*.

Table 4-51: Fixed-Effects Filtered models for input efficiency with PSM and its dimensions as explanatory variables

		Dependent variable: input efficiency			
<i>First stage fixed-effects model with time-varying regressors</i>		Coeff.	SE		
<b>C</b>		-0.825973*	(0.445378)		
<b>ALOS</b>		-0.019401	(0.021488)		
<b>REFP</b>		2.05E-05***	(5.26E-06)		
<b>TIME</b>		0.030451***	(0.009294)		
<b>COVID19</b>		-0.125204***	(0.018443)		
<b>R-squared</b>		<b>0.880900</b>			
<b>Adjusted R squared</b>		<b>0.809440</b>			
<b>F-statistic</b>		<b>12.32715</b>			
<b>Prob(F-statistic)</b>		<b>&lt;0.00000</b>			
<i>Second stage: Between model with time-invariant regressors</i>					
<b>C</b>	1.972547 (3.024185)	1.361720 (2.1132)	-0.094034 (1.937112)	-1.489788 (2.702475)	
<b>PSM</b>	-0.003420 (0.003090)				
<b>APS</b>		-0.009573 (0.00722)			
<b>SS</b>			-0.004697 (0.008212)		
<b>CPV</b>				0.001492 (0.010196)	
<b>TECH</b>	-0.639050 (0.543374)	-0.738947 (0.5189)	-0.520534 (0.511267)	-0.414955 (0.487507)	
<b>TERRITORIES</b>	0.658155*** (0.228229)	0.626138** (0.2521)	0.640649*** (0.222419)	0.593267** (0.221648)	
<b>URBAN_RURAL</b>	-1.454273** (0.563492)	-1.263730** (0.5695)	-1.579481** (0.577390)	-1.660526*** (0.581376)	
<b>R-squared</b>		<b>0.336208</b>	<b>0.352990</b>	<b>0.315370</b>	<b>0.308248</b>
<b>Adjusted R squared</b>		<b>0.215518</b>	<b>0.235352</b>	<b>0.190892</b>	<b>0.182475</b>
<b>F-statistic</b>		<b>2.785726</b>	<b>3.000642</b>	<b>2.533535</b>	<b>2.450827</b>
<b>Prob(F-statistic)</b>		<b>0.051796</b>	<b>0.040616</b>	<b>0.069220</b>	<b>0.076206</b>
<b>Num.obs.</b>	81	81	81	81	
<p>Note: (1) Efficiency scores from a DEA model with variable returns of scale. (2) Scores calculated from the sample without outliers, albeit these were re-entered into the regression models with a score of 1. (3) For the first step, the fixed-effects model was estimated via panel EGLS (cross-section weights), with linear estimation after one-step weighting matrix. In parenthesis, standard errors. The included model indicators are weighted statistics. (4) For the second step, the between model was estimated using OLS. In parenthesis, HAC standard errors (Bartlett kernel, Newey-West fixed bandwidth = 3.0000). (5) ***p &lt; 0.01, **p &lt; 0.05, *p &lt; 0.1.</p>					



Figure 4-13: Actual, predicted and residual values from the FEF models for input-efficiency scores with PSM and its dimensions as regressors



In the next table 4-52 we presented the results for the FEF models with output efficiency as dependent variable. In the FEF first stage, our time-varying variables are entered as regressors into a fixed-effects model, the same as in the previous model (Table 4-51). The model fits relatively high ( $R^2 = 0.95$ ), as can also be seen in Figure 4-14, and it shows a high joint significance ( $p$ -value  $< 0.00000$  for the  $F$  statistic). Moreover, the individual significance tests allow rejecting the null hypothesis for the variables *ALOS*, *REFP*, *TIME* and *COVID19*, whereas in the input model *ALOS* was not significant.

Similar to the results in the FFE model for input efficiency, refugees proportions living within gouvernante tend to increase the efficiency of the hospital that operate there. However, within the output efficiency model it seems that the influence ( $\beta=2.7$ ) is slightly stronger than in the model for input efficiency ( $\beta=2.05$ ). This concretes our inference and give it more credibility, that the greater of the refugee's proportion the more demanding of healthcare with greater expectations of outputs.

As in the previous model, the time-counter variable was found to be positively influencing efficiency at the significance level of 1%. This result is matching the results of the WB models with output efficiency, which make these results sounder. Thus, this also indicate the positive trend of output efficiency as well input efficiency in the period of 2019-21. Additionally, the results show a pattern of negative effect of *COVID-19* on efficiency in both input and output FFE models. This influence appears to be marginally robust, with a very close values between WB models ( $\beta=-0.10$ ) and FFE models with output efficiency ( $\beta=-0.12$ ), and the statistical significance (1%). As we explained earlier, in the previous model (Table 4-51), there are some empirical bases that could lead our explanation for these results. For instance, due to the pandemic, the JMoH decreased the working labour and send a proportion of them to work from home or they come to the hospital based in the urgency of the situation. Moreover, as we mentioned before, the sick leave, the hesitating to go to work, and mental health. These reasons, therefore, may damped efficiency in Jordanian hospitals.

The results of WB and FEF models concerning the variable *ALOS*, are almost equal. In the WB output models the beta coefficients were -0.079 and in the FEF output models -0.09. In contrary to what happened

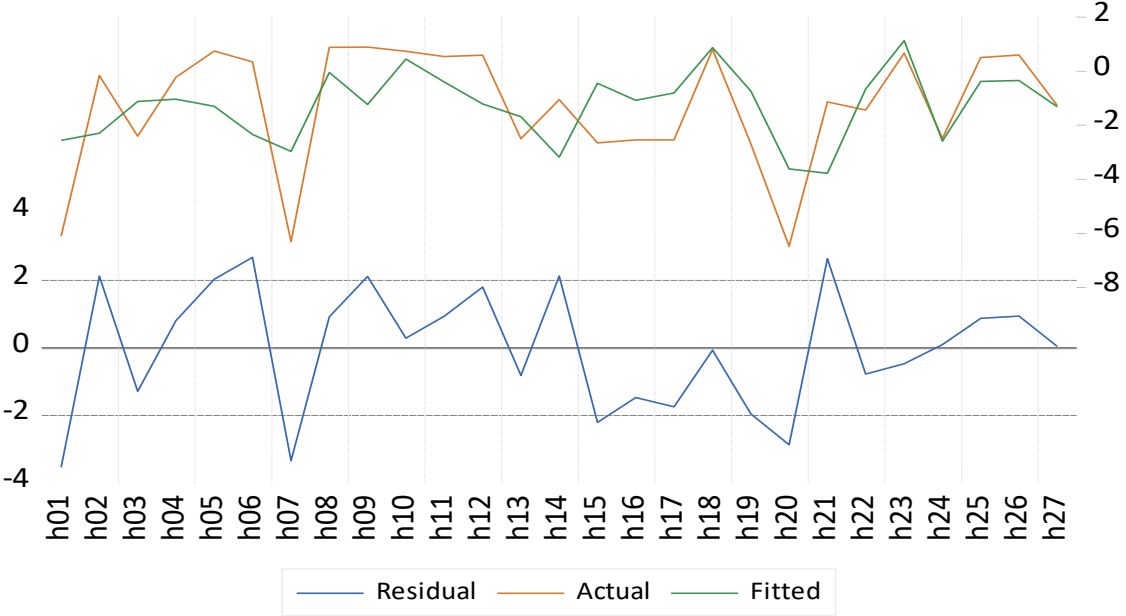
in the FEF model for input efficiency, within the FEF model for output efficiency *ALOS* is statistically significant at the 5% alpha level. However, this result indicates that the increase of the average length of stay of patients in a hospital tend to decrease the output efficiency, which is totally logical for the reason that the occupation extension of a bed by a patient impedes to deliver healthcare to other patients with the same bed, putting a burden in the efficiency of the hospital.

In the second stage of FEF model with output efficiency, the model was able to explain around a third of the variance of output efficiency. The model shows similar joint significance to FEF models for input efficiency. The model achieves a joint significances at the alpha level of 1%, when the Wald F-statistic is used; however, they remain between the 5% (second model) and 10% (first, third and fourth models) levels if the F-statistic is chosen. Between the inserted regressors, the same as in the models for input efficiency, only *TERRITORIES* and *URBAN-RURAL* variables have statistically significant effects on output efficiency. This influence of the former seems to be higher and more significant when PSM or SS are included as explanatory variables. However, the influence of the latter appears as higher and more significant when SS or CPV are included as explanatory variables. In any case, this indicates that hospitals that are working in urban areas are less output efficient. Therefore, in the first FEF models, the beta coefficient of the *URBAN-RURAL* variable is statistically significant at the 10% alpha level. On the other hand, in the rest three models the relationship was statistically significant at the 5% level. As in the previous model in table 4-51, PSM and its dimensions did not seem to have any influence on output efficiency at the conventional significance levels. Moreover, they demonstrate negative beta coefficients, unless in case of CPV, which has the coefficient closest to zero as in the FEF model with input efficiency. Accordingly, our FEF-model results for PSM and its two first dimensions led us, again, to consider the possible trade-offs between output efficiency and other performance criteria more linked to PSM.

Table 4-52: Fixed-Effects Filtered models for **output efficiency** with PSM and its dimensions as explanatory variables

Dependent variable: output efficiency				
<i>First step fixed-effects model with time-varying regressors</i>				
	<b>Coff.</b>	<b>SE</b>		
<b>C</b>	-1.283328*	(0.460959)		
<b>ALOS</b>	-0.092290**	(0.027113)		
<b>REFP</b>	2.71E-05***	(5.57E-06)		
<b>TIME</b>	0.051537***	(0.005825)		
<b>COVID19</b>	-0.11837***	(0.006210)		
<b>R-squared</b>	0.951943			
<b>Adjusted R squared</b>	0.923109			
<b>F-statistic</b>	33.01442			
<b>Prob(F-statistic)</b>	< 0.000000			
<i>Second step: Between model with time-invariant regressors</i>				
<b>C</b>	2.537018 (4.056509)	1.659206 (2.834765)	-0.244037 (2.597749)	-2.243235 (3.589708)
<b>PSM</b>	-0.004719 (0.004143)			
<b>APS</b>		-0.013072 (0.009710)		
<b>SS</b>			-0.006801 (0.011054)	
<b>CPV</b>				0.002072 (0.013497)
<b>TECH</b>	-0.825714 (0.725026)	-0.958938 (0.692799)	-0.669496 (0.680254)	-0.516557 (0.650382)
<b>TERRITORIES</b>	0.886990** (0.300156)	0.842437** (0.335224)	0.865674*** (0.293489)	0.797413** (0.292625)
<b>URBAN_RURAL</b>	-1.859478* (0.753652)	-1.602288** (0.763365)	-2.026295** (0.771397)	-2.143978** (0.776641)
<b>R-squared</b>	<b>0.327826</b>	<b>0.345037</b>	<b>0.306045</b>	<b>0.297494</b>
<b>Adjusted R squared</b>	<b>0.205613</b>	<b>0.225953</b>	<b>0.179872</b>	<b>0.169765</b>
<b>F-statistic</b>	<b>2.682406</b>	<b>2.897421</b>	<b>2.425588</b>	<b>2.329113</b>
<b>Prob(F-statistic)</b>	<b>0.058295</b>	<b>0.045626</b>	<b>0.078483</b>	<b>0.087867</b>
<b>Num.obs.</b>	81	81	81	81
<i>Note:</i> (1) Efficiency scores from a DEA model with variable returns of scale. (2) Scores calculated from the sample without outliers, albeit these were re-entered into the regression models with a score of 1. (3) For the first step, the fixed-effects model was estimated via panel EGLS (cross-section weights), with linear estimation after one-step weighting matrix. In parenthesis, standard errors. The included model indicators are weighted statistics. (4) For the second step, the between model was estimated using OLS. In parenthesis, HAC standard errors (Bartlett kernel, Newey-West fixed bandwidth = 3.0000). (5) ***p < 0.01, **p < 0.05, *p < 0.1.				

Figure 4-14: Actual, predicted and residual values from the FEF models for output-efficiency scores with PSM and its dimensions as regressors



## CHAPTER V: DISCUSSING FINDINGS AND RECOMMENDATIONS

We presented the results of this study in the previous chapter, and this chapter will discuss these results, paying special attention to comparison with the results of previous relevant studies, which are few. After the discussion - and in the light of it - we present the most important conclusions drawn from this study and its results, and then conclude the chapter with recommendations for future research, which can be starting points for future researchers or a beacon guiding the progress of their research.

### 5.1 FINDINGS DISCUSSION

In this section, we discuss the most important findings of the current study and link this study with previous studies by making comparisons between the results of various related studies. However, we present the scientific material related to the sequence of analysis and statistical tests that were carried out on the study data, to conclude the chapter with the results related to the study's hypotheses tests. From the beginning, we draw attention to the fact that PSM is the subject of discussion in this study, with its influence on ethical behaviour and organizational performance.

The PSM level defined by the mean of its three studied dimensions (i.e., APS, SS, CPV) of Jordanian public hospitals is within a (low) level ( $X = 2.73, SD = 0.75$ ), because its arithmetic mean was smaller than the arithmetic means of the (*Moderate*) grading with a statistically significant difference ( $\alpha = 0.05$ ), based on the *Standard Scaling*. This result is contradicted by the results of (Hassan & Ahmad, 2020;  $X = 4.49, SD = 0.49$ ) who studied the relationship between PSM and work ethics in 13 public and private organizations in Kurdistan Iraq in nearly

similar non-Western setting as Jordan. On the other side, this study agrees with the study results of (Shahda, 2016), where the level of PSM was Moderate ( $X= 3.60$ ,  $SD=1.10$ ) in the Lebanese ministries. Also, this study is contradicting the study results of (Miao, et al., 2019) where the level of PSM were high ( $X=3.94$ ,  $SD=0.64$ ). The order of the PSM dimensions levels in the Jordanian hospitals is as follows: CPV came in the first place within the (Moderate) level which agrees with the results of (Shahda, 2016;  $X= 4.29$ ,  $SD=0.1$ ) because its mean was greater than the mean of the middle grading with a statistically non-significant difference ( $\alpha = 0.05$ ). Then the SS came in second place within the (low) level, which also agrees with (Shahda, 2016;  $X= 4.29$ ,  $SD=0.1$ ). Afterwards, APS ranked third within the (low) level, and this contradicts with (Shahda, 2016;  $M= 2.33$ ,  $SD=0.09$ ).

The level of ethical behaviour of Jordanian public hospitals' employees is within the (Moderate) level ( $X=2.97$ ,  $SD=0.72$ ), because its arithmetic mean was smaller than the arithmetic means of the middle grading of the Likert scale with a statistically non-significant difference ( $\alpha = 0.05$ ). This result is in line with the study of (Keiper, et al., 2020) where the level of ethical behaviour was Moderate ( $X=2.61$ ,  $SD=0.63$ ). However, this study contradicts the study results of (Kumar, et al., 2019) who studied the ethical behaviour of (12) public and private hospitals in India where the level of ethical behaviour was high ( $M=4.12$ ).

The order of ethical behaviour dimensions was as follows: the EBC ranked first within the (high) level ( $X=3.25$ ,  $SD=1.0$ ) because its arithmetic mean was greater than the arithmetic mean of the middle grading Likert scale, where this result study agrees with several previous studies, for instance, the study of (Keiper, et al., 2020) found that the level of EBC is high ( $M=3.44$ ,  $SD=0.39$ ). These results also harmonised with the study of (Kumar, et al., 2019;  $X=4.08$ ,  $SD=2.7$ ). Then EBS ranked the second within the (Moderate) level ( $X=2.93$ ,  $SD=0.92$ ), this result differs slightly from one of the results of (Joseph, et al., 2010), who's studied the causes affecting ethical behaviour of public college students in the mid-western and north-western US. Where the level of EBS was high ( $X= 3.35$ ,  $SD=0.39$ ). Then, the last ELS ranked the third within the (low) level ( $X= 2.82$ ,  $SD=0.92$ ),

because its arithmetic mean was smaller than the mean arithmetic for the middle Likert scale grading with a statistically significant difference ( $\alpha = 0.05$ ). This result differs from the study results of [Birel \(2019\)](#). Also, the result contradicts with the results of [Franczukowska, et al. \(2021\)](#) where they study the ELS in Austrian private and public healthcare organizations, and the level of ELS within these organizations was high ( $X=3.128, SD=0.867$ ).

*We think that the reason for the inconsistency in the PSM, ethical behaviour and their dimensions levels, in all the studied organizations despite the obvious differences between them, the sectors to which they belong, and the countries in which these studies were carried out is that the attention for the concept of PSM and ethical behaviour is not controlled and having consideration from the managers in the high-level administration.*

In this study, we found a difference between PSM, and ethical behaviour attributed to sociodemographic variables in Jordanian public hospitals. For instance, we found that there are no significant differences between the arithmetic means of PSM in Jordanian public hospitals, resulting from the different sociodemographic variables (i.e., *gender, educational level, age, practical experience, administrative status, and job title*). These results are contrasted between agreement and disagreement with the results of [Camilleri \(2007\)](#) who studied the antecedents of PSM and one of them is the personal attributes (i.e., age, gender, education, job level, salary, job tenure, organisation tenure, family life cycle status) where the study found that there are no significant differences based on age. However, regarding gender, the study found that females show higher levels of PSM only for COM, which partially agrees with the classical and most important study on the literature on PSM by [Naff and Crum \(1999\)](#). Within the same context, our results agree with the results of [Aydin et al. \(2021\)](#) who studied the influence of PSM on work ethics in Turkey, and they found that gender, age, generation, duty, and seniority. Moreover, [Bright \(2005\)](#) found that women are more likely to have higher levels of PSM, especially who have higher educational levels and administrative positions.



Another important finding was that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the arithmetic mean for the ethical behaviour of public hospital employees in Jordan, yielded to gender ( $F=5.41$ ,  $Sig=0.02$ ,  $p\leq 0.05$ ). Where females exalt the ethical behaviour of the employees of Jordan's public hospitals more than their male colleagues did. These results have been proved and confirmed by many researchers such as [Collins \(2000, p.9\)](#) after reviewing 1500 articles conserving ethics, he found that females tend to act more ethically than men, with evidence from 47 studies that show that none of the men within these studies is more ethical than women. Within the same context ([Joseph, et al., 2010](#)) found in their study sample that females were significantly more ethical than their male colleagues, however; [Loe et al. \(2000\)](#) arrived to the same conclusion based on 26 studies. On the other hand, [Boateng & Agyapong \(2017\)](#) found that in their study that males behave more ethically than females, while females have higher ethical behaviour intentions than males. While there have been studies with conflicting results, for instance, [Kidwell et al. \(2013\)](#), found that males claimed that females as being significantly less ethical than themselves and vice versa.

The results suggest that there is a statistically significant difference at the alpha level ( $\alpha = 0.05$ ) between the arithmetic mean of Jordanian public hospitals employees' ethical behaviour, yielded to educational level ( $F=3.74$ ,  $Sig=0.02$ ,  $p\leq 0.05$ ). This result supports the prevailing belief that education in general and the level of education, in particular, is reflected in the ethical behaviour of individuals ([de Casterle, 1996](#)), and this has been proved by several prominent studies within the health sector employees (e.g., [Crisham, 1981](#); [Munhall, 1980](#)).

However, our result has been supported by [Nikoomaram et al. \(2013\)](#) who studied ethical behaviour defined by ethical behaviour of decision making and its relationship with personal attributes. They find that educational level has a significant impact on the ethics of individuals. On the contrary, these results disagree with the study of ([Doyle & O'Flaherty, 2013](#)) who measured the impact of educational levels on ethical behaviour defined by moral reasoning, where they find

that there are no significant differences between individuals' ethical behaviour and their educational level.

Constant with extant literature, our study reports mixed findings regarding the influence of PSM on ethical behaviour. First of all, it is worth mentioning that the results of this study, provide support to most of our adopted hypotheses. With regard to the main adopted hypothesis, the results of the current study showed that the PSM collectively, defined by its studied three dimensions (i.e., APS, SS, CPV) positively influences the ethical behaviour defined by its three dimensions (i.e., EBS, EBC, ELS) of employees ( $R^2=0.35$ ,  $\beta=0.60$ ,  $Sig=0.00$ ) and that it alone explains (35.72%) of the variances in the ethical behaviour of Jordanian public hospitals' employees, and if their PSM level increases by one standard deviation, their ethical behaviour increases by (0.5977); where the value of the estimated unstandardized regression coefficient was (0.5625) with a standard error of (0.03). This obtained result, supports the argument that highly motivated individuals are driven by values and ethics, whereas PSM has a positive influence on many ethical outcomes<sup>19</sup> (e.g., [Brewer and Selden, 1998](#); [Caillier 2015](#); [Lim Choi, 2004](#); [Houston, 2006](#); [Kwon, 2014](#); [Maesschalck et al., 2008](#); [Moynihan, 2010](#); [Wright et al., 2016](#)). Also, our results harmonize with various studies from proactive researchers and public administration scholars (e.g., [Ripoll, 2018](#); [Meyer-Sahling et al., 2018](#); [Wright et al. 2016](#)) that have underscored the potential contribution of employee PSM to their ethical behaviour.

On the one hand, this result is consistent with the results of a few previous studies. For instance, the study results of [Lim Choi \(2004\)](#), who studied the influence of PSM on ethical behaviour defined by ethical reasoning in the American municipal governments ( $R^2=0.0827$ ,  $\beta=0.23$ ,  $Sig=0.00$ ). Our results are also consistent with the study of [Wright and Christensen \(2021\)](#) which they conducted on a group of college students in the US, where they find that PSM influences ethical behaviour positively and predict it, but they argued that still, they don't have certain evidence that PSM affects ethical behaviour which leaves

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<sup>19</sup> Ethical outcomes could be varied, i.e., ethical behavior, ethical decision making, ethical dilemmas, and unethical judgment.

the door open for in this dark box of PSM without solid conclusions regarding this relation. Moreover, they claim that they weren't able to confirm the best mechanism to increase ethical behaviour within their study design. In line with these results, [Caillier \(2017\)](#) found that PSM increases the ethical behaviour defined by external and internal-external whistleblowing, and positively influences it, whereas as a result, this will lead to influence the individual's decisions to report (un)ethical behaviour. On the other hand, this result contradicts the results of a few previous studies. For instance, [Olsen et al. \(2019\)](#) found that PSM is strongly negatively related to ethical behaviour characterized by dishonesty as robust evidence among public employees in Denmark.

In the next paragraphs, we will discuss the influence of PSM dimensions on ethical behaviour, and the influence of PSM dimensions on ethical behaviour dimensions, despite the scarcity and rarity of these studies. For instance, Self-sacrifice (SS) has known as a critical factor that influences ethical reasoning within organizations ([Choi, 2004](#)). Our results partially agreed with this motto, for the reason that the influence of SS on ethical behaviour in Jordanian public hospitals was very weak as shown in  $H_{1,2}$  ( $\beta=0.09$ ,  $Sig=0.00$ ), and in other cases was nonsignificant (i.e.,  $H_{1,2,2}$ ). Given the fact that SS heightens the sense of ethical behaviour orientation within organizations. This could be shown in the high level of manifestation of organizational effects over PSM by public interest, (e.g., whistle-blowing as an ethical behaviour act, it needs a higher level of SS to do).

However, at the level of the dimensions, we found that and in the CPV is the strongest predictor of ethical behaviour ( $\beta=0.59$ ,  $Sig=0.00$ ). Explaining (43.67%) from the ethical behaviour of Jordanian public hospitals, where the value of the estimated unstandardized regression coefficient was ( $R^2=0.436$ ). This result is supported by the theory of PSM, where CPV is reflected as a normatively based motive; in order to fulfil public interest obligations ([Wang, et al., 2020](#)). Our result has been supported by a few researchers, including [Gans-Morse et al. \(2019\)](#) who found that CPV has a positive influence on ethical behaviour defined by given or accepted bribes in a comparative panel study they conducted in Ukraine and Russia ( $R^2= 0.553$ ,  $p<0.001$ ).

This result is contrary to that of [Gans-Morse et al. \(2019\)](#) who found that CPV has a negative influence on ethical behaviour in a panel study in Ukraine ( $R^2=-0.486$ ,  $p<0.001$ ) and Russia ( $R^2=-0.486$ ,  $p<0.001$ ).

However, our results indicate that our proposed main hypotheses ( $H_{1.0}$ ) are useful for understanding the relationship between two debatable, and rarely studied variables, within the context of non-Western countries and in particular Jordan. In line with the aforementioned discussion, Jordanian public sector employees tend to have intrinsic motivation rather than extrinsic motivation. While this seems like a good sign, it might be a cover for a beneath problem. However, our study showed that public sector employees in Jordan especially in the public health sector are intrinsically motivated, which indicates that they don't need external factors to be incorporated into the job which reflects in their ethical behaviour. On the one hand, this might support the logical rationality that states that public administration employees are driven by their altruistic behaviour by putting their self-interest aside and helping the community as their main duty ([Vandenabeele & Horton, 2008](#)). On the other hand, this also supports the incipient research that addresses this relationship (e.g., [Brewer and Selden, 1998](#); [Kwon, 2014](#); [Wright, et al., 2016](#); [Caillier, 2017](#)).

Regarding the interrelationships between the dimensions of PSM and ethical behaviour, we found based on what we assumed an existing difference or uneven influence between the PSM dimensions and ethical behaviour dimensions. The influence of CPV on EBS was found to have the strongest influence among all the other PSM dimensions ( $\beta=0.66$ ,  $Sig=0.000$ ,  $R^2=0.73$ ), also, the influence of CPV on EBC has the second greater value ( $\beta=0.45$ ,  $Sig=0.000$ ,  $R^2=0.40$ ). On the other hand, we found that some paths are nonsignificant, for instance, the influence of APS on EBS and EBC, and the influence of SS on EBC. More importantly, our results seem to match the very few studies that studied the nature of the PSM dimension's relationship between other organizational work outcomes such as (ethical behaviour) at the dimensional level, this assumption arises from the fact that PSM is a multidimensional concept ([Bangcheng, 2009](#)). This has been stated by

many researchers who insisted that this nature of PSM appears when studying the construct simultaneously, where some dimensions seem to manifest a dominant role of influence on the work outcomes (Taylor, 2007). In our opinion, we agree with Taylor (2007), for the reason that public employees are driven by many motives that are different from one employee to another, and that was very obvious in our case, proven by the different strengths and orientations of associations in the dimensional level within the hospitals of JMoH.

It is worth mentioning that the researchers were aware of the inability to find any published study related to the influence of PSM's dimensions on ethical behaviour dimensions, and organizational performance defined by the efficiency score of the JMoH hospitals or even in the middle east in any year in general and during the study period in particular, which prevented us from making direct comparisons between the results of our study and any other similar studies from this point of view. Hence, we know it is not advisable to compare the influence of PSM on ethical behaviour and organizational performance of the Jordanian public hospital's employees with the PSM of employees in any other Jordanian or non-Jordanian organization due to the difference in individuals - workers, i.e., the elements of the study sample - and the organizational and cultural differences between organizations or countries. However, we chose to compare the results even with this limitation in order to widen our gaze for the possible implications of our results, and its applicability, similarity, and dissimilarity with different studies from different contexts and cultural settings, which emphasises the novelty of our study and its rarity.

The second fold of our study aimed to empirically investigate the influence of PSM on organizational performance. Hence, based on the eagerness of the scholars' community to identify a predictable connection between workers motivation and organizational performance, we study this relationship. Indeed, despite of the scholars' eagerness, the mechanisms underlying the relationship between PSM and public sector organizational performance remain as a "black box" (Andrews & Boyne, 2010; Mostafa & Leon-Cazares, 2016). Our study addressed this gap by investigating the influence of PSM on

organizational performance defined by efficiency using two-stage DEA.

However, this gap has been addressed by [Meier and O'Toole \(2013a\)](#), who strongly advised not to use ordinary methods such as survey-based methods to measure organizational performance due to the CMB. They studied the performance as a dependent variable of public schools workers by comparing two different models using external measurements of performance. In light of their findings, [Meier and O'Toole](#) highly suggested not to use survey-based methods and they viewed critically any existing studies with this type of measurement. Within the same context, earlier, [Andersen and Serritzlew \(2012\)](#) used archival data for a measure that could lead to heightened performance as a step in the right direction.

Following the steps of [Meier and O'Toole](#) are two of the pioneers in the literature of public administration in general and PSM in particular, namely, [Petrovsky and Ritz](#). In their paper, [Petrovsky & Ritz \(2014\)](#) studied the influence of PSM on the procedural efficiency aggregated at the organizational level, taking their data of the dependent variable from a different source (i.e., efficiency indexes) from the Swiss federal government. Considering their findings, they argued that using separate measures to capture the organisational performance is highly recommended. However, while this direction could be theoretically supported, previous studies took less than satisfactory methodological steps to evaluate and test it ([Petrovsky & Ritz, 2014](#)).

Thus, based on the beforementioned debate, we have examined the potential consequences of this suggestion (i.e., using non-survey based performance measures) by contrasting results from a two-stage DEA. Firstly, we calculated efficiency scores using first-stage DEA. The results indicate that the average efficiency of Jordanian public hospitals during the period (2019–21) varied between 82% and 88% between all the four adjusted DEA models.

We compared our results with the only two DEA studies that had been performed on public hospitals in HKJ (i.e., [Al-Shammari, 1999](#); [Ajlouni, et al., 2013](#)). They studied 15 Jordanian public hospitals. These results illustrate the fluctuation in the efficiency of public sector hospitals over time. Our results regarding this fluctuation in the first

stage of DEA relatively agree with those previous studies. The observed behaviour could be due to the crisis of the refugees' brothers, which is considered a challenge for Jordanian public health and pharmaceutical costs, where these costs took a huge share of the Jordanian GDP, and this cast a heavy burden on the JMoH. Additionally, the wages of medical staff, have an influence on the expenditures.

Furthermore, regarding the second stage of our analysis, we found that PSM was negatively associated with organizational performance. This result is dissimilar to most of the previous literature (e.g., [Alonso & Lewis, 2001](#); [Andrews & Boyne, 2010](#); [Li, 2008](#); [Belle', 2012](#); [Zubair, et al., 2021](#)). But, as stated by [Petrovsky and Ritz \(2014\)](#), "*some of the findings in the existing literature about a positive effect of PSM may be most parsimoniously explained by common-method bias*". In the same vein, [Shirouyehzad et al. \(2012\)](#) studied the organizational performance in Isfahan province of Iran using DEA, and they included in the model some organisational factors, such as organisational commitment, turnover, satisfaction, and finally motivation. They argued that any organisation has the aim to increase its organisational performance, which could be through increasing the aforementioned organisational variables that they included in the study. Additionally, they highlighted that traditional performance approaches are vastly different from DEA, for the reason that an employee with the highest performance is not necessarily the most efficient ([Shirouyehzad et al., 2012](#)).

The Covid-19 pandemic has been found to have a negative influence on performance, agreeing these results with some previous studies (e.g., [Ocaña-Riola, et al., 2021](#)). This negative influence is totally understandable, since such outbreaks put hospitals under a real test of their performance, in order, to deliver faster health assistance, develop protocols for patient care, understand how this virus behaves, and finally how to find or develop a diagnostic test that is sufficient and reliable. In addition, the pandemic has a massive influence on regular health care services ([Marin-Garcia, et al., 2021](#)). For instance, in Jordan, they took very strict protocols, among many other things, closing all the public hospitals and opening only specific hospitals in each province, and they stopped all the surgical operations. Hence, some of the hospitals and especially in the rural areas have been laid



off, which had a negative influence on the performance of the healthcare sector (Paavola, 2020).

The results suggest that ALOS negatively influenced performance. This result was found to be partially agreed with the study of Sultan and Crispim (2018), who analysed the performance of Palestinian public hospitals using two-stage DEA. In their results, the beta coefficient for ALOS was positive in three models and negative in the other three models of Tobit regression, but it was insignificant. On the other hand, Mujasi et al. (2016) found that ALSO was not significantly correlated with efficiency scores. They justified this insignificance by arguing that this variable partially measures the relationship between inputs and outputs. Moreover, our study differs from the study of Piubello Orsini et al. (2021) who assess the performance of Italian public hospitals using two-stage DEA, where they found that ALOS is positively and significantly related to efficiency scores. Although their result agrees with many previous studies (e.g., Staat, 2007; Dimas, et al., 2012), it contrasts from the study of Daidone and D'Amico (2009). One of the suggestions to improve hospitals' performance that often arises from a DEA is to have shorter ALOS, which will reflect in the number of deaths and readmissions (Pitocco, et al., 2020). For this reason, we agree with Pitocco *at al.* that decision-makers should give ALOS some more concerns.

In our results, was found that the location of the hospital has an influence on the performance of the hospital. As we explained later, our geographic indicator *TERRITORIES* was found to positively influence input and output efficiency. The more southern a hospital, the more input efficiency tends to achieve. Our results may be related with the lower economic welfare and higher inequality of the south of Jordan. From this point of view, they differ from the study of Serván-Mori et al. (2018), who focused on the performance of public hospitals in Mexico, finding that performance was higher the more they go to the north. They attributed these results to the economic inequality in the south and south-eastern provinces, where the presence of the indigenous populations is more. Concerning our second geographic indicator (i.e., *URBAN-RURAL*), we found it positively influences performance with input-oriented models. These results agree with the results of Cinaroglu



(2021), who found that performance is affected by the location of the hospital and, more concretely, that “*the likelihood of being efficient significantly increased with urban location*”.

Hospital size has been found to be one of the crucial factors that influence the efficiency of hospitals (Lindlbauer, et al., 2016). Based on the Scale Efficiency Theory, a hypothetical scale exists that makes each hospital fully productive, and efficient hospitals have production units that works with its optimal capacity based on their output (Masiye, 2007). For instance, the expansion of hospital size will involve increasing the bed capacity, medical staff, and equipment. This will lead, albeit not necessarily, to increase the efficiency of the hospitals by promoting the effective use of the infrastructure and equipment (Giancotti, et al., 2017). Within this regard, our explanatory variable HSIZE were found to be nonsignificant in the econometric models. Our results agree with the results of Sultan & Crispim (2018), who found that the size of the hospital does not have a significant effect on efficiency. On the contrary, our results differ from the study of Cinaroglu (2021), who found that hospital size is a key detriment factor for the efficiency of the hospitals. On the other hand, the result of Piubello Orsini et al. (2021) found that hospital size is negatively influencing the hospital’s efficiency, and they consider it one of the important factors of hospital inefficiency.

Asylum percentage of refugees living in every governorate was found to be statistically significant in some of the models (i.e., the first and fourth of the WB models for output efficiency), whereas, in other models, it was nonsignificant. However, Sultan and Crispim (2018) indicate that the proportion of refugees that live in the different governorates in Palestine is not significantly affecting the performance of the hospitals in these governorates. As Jordan rebuilds from the pandemic, and with a total of 3,009,517 refugees living in Jordan, this cast an extremely heavy burden on the HKJ (World Bank, 2022). This burden can be translated into the context of the health sector by the huge demand for health aid, maternal and child healthcare services, pharmaceutical needs, medical assistants, etc. Indeed, the impact of the refugee crisis on the health sector and the services provided by the JMoH stress the need to provide devices and equipment appropriate to

the increase in health sector services demanded by the refugee crisis (with the accompanying diseases among refugees and pressure on health institutions). Moreover, the continuous influxes of our Syrian refugees' brothers into the Kingdom have imposed huge challenges on the health and education sectors considering the sharing of basic services and infrastructure between Jordanian citizens and refugees, what has placed more burdens on official institutions. Despite the kindly aid provided by the international community, the volume of that aid did not, however, reach the hoped-for level.

In sum, we conclude that until studies either begin to draw on separate data sources for PSM and performance or use new research designs such as our model, we are left with limited knowledge on the PSM-performance linkage, and we encourage future researchers to take steps towards enhancing and introspection of this arena of research.

## 5.2 CONTRIBUTIONS OF THE STUDY

Based on what has been discussed in the previous section, this thesis contributes to the understanding of the relationship between PSM, ethical behaviour, and organizational performance empirically and theoretically in the literature on public administration, organizational behaviour, and economics, from different perspectives.

Our study underscores the importance of the influence of PSM on ethical behaviour. First, despite the very few studies that investigate the direct relationship (e.g., [Lim Choi, 2004](#); [Houston, 2006](#); [Kwon, 2014](#); [Maesschalck et al., 2008](#); [Moynihan, 2010](#); [Wright et al., 2016](#); [Meyer-Sahling, et al., 2019](#)) our study is still one of the preliminary studies that investigate this arena and contribute to this exposition of the relationship. Also, one of the key contributions of this study is that prior researchers that studied these two variables, ignore the interrelated relationships between the dimensions of each variable, where our study contributes to this novelty.

Mostly, the prior work of PSM and the theory has been applied in developed countries in western cultural and structural sittings. Since the expansion of PSM literature Very little research has been done so far in a non-western context, especially in Arab statues (e.g., [Belrhiti, et al., 2019](#); [Hassan & Ahmad, 2021](#)). For this, we hope that our study to be

the starting point in Jordan and the neighbouring countries to contribute to the theory of PSM.

This study also has a methodological contribution, concerning how we studied the relationship between PSM using questionnaire data and we regress them on the efficiency score of the first stage of DEA; to investigate the influence of PSM on organizational performance using two-stage DEA. This contribution is concerned with two disciplines when public administration meets the economy. This might open a new door to the literature of PSM for new possibilities and multidisciplinary approaches.

Our idea is based on the claim that traditional methods that capture organizational performance are characterized by a lot of disadvantages, which put the need to develop and adopt new evaluation methods. From this point came our contribution by using DEA, which helps to overcome many weaknesses, and introduces comprehensive indicators to evaluate individuals' performance via efficiency scores. Furthermore, despite the huge body of literature concerning measuring the performance of the healthcare sector using the DEA, still, there is a scarcity of empirical academic production, especially in developing countries, which could be due to the unavailability of data (Sultan & Crispim, 2018). Particularly, in Arabic countries, four studies were conducted in the public health sector, only one of them in Jordan. Aimed at Jordan, until now, no study has studied the organizational performance in Jordan using two stage-DEA.

Additionally, our study introduces a very important and interesting methodological contribution regarding the constructs of PSM and ethical behaviour, where we developed a tool with very robust indices for the Jordanian public health sector reality. Given the fact that most of the literature on PSM is focused on enhancing the scale and developing it, which will be a road map for future researchers. Our EFA and CFA results showed that obtained from our empirical study fit the theoretical dimensions of PSM and ethical behaviour. Also, our study shed the light on a methodological question concerning the originality of COM as a dimension or facet of PSM facets as a single formative scale -construct. Although this issue had been raised recently by several

researchers (i.e., [Coursey, et al., 2011](#); [Vandenabeele, 2008](#); [Esteve, et al., 2016](#)). This study adds empirical evidence to re-evaluate the necessity of adding COM into the construct of PSM.

According to our limited knowledge, our study is the first study that combined these variables together and study them in Jordan or in the public health sector in Jordan. This fills one of the most important gaps from prior research since most of them are only focusing on the developed countries. In addition, our study studies the whole spectrum of employees in the Jordanian public hospitals, whereas, on contrary, most of the previous research on PSM focuses mostly on one stratum (e.g., leaders, executive workers, students, etc.).

To sum up, our study success to fill the gaps that have been presented in the body of the research problem; by discovering the relationship between PSM and ethical behaviour, the relationship between their dimensions, and the relationship between PSM and organizational performance using a different technique from self-reported performance measurements in public organizations, also the multitude of PSM and ethical behaviour instruments or indices and lack of a standard index, and finally the validity of the relationship between the studied variables in Non-Western environments.

### **5.3 STUDY LIMITATIONS**

While our findings offer insights into the relationship between PSM, ethical behaviour and organizational performance in the Jordanian public sector, this study like any other study, is subject to several empirical limitations.

Firstly, the first part of our research is based on a cross-sectional design, which means that we are not able to infer and capture causality between PSM, ethical behaviour and organizational performance. Even though causality has been reasoned and based on theories, logical rationality, and logical interpretations, however; the only way to assess it -the causality- is by conducting experimental designs over a long period of time. Second, our study has been conducted in one country and in a specific sector (i.e., Health Sector), so this opens the debate on the generalizability of the results, where it should be with caution.

Thirdly, the constructs of PSM and ethical behaviour were self-reported scales. Which could jeopardise the data for social desirability and CMV. We used many techniques to avoid and eliminate these issues, by including the Over-claiming Scale within the constructs of PSM and ethical behaviour to capture if the respondents tend to be over claimers (Ludeke & Makransky, 2016). However, our results indicate that the data is free from CMV. Moreover, we assure the anonymity of the respondent's answers and personal information.

To decrease the probability to have social desirability bias, we follow the technique of Podsakoff et al., (2003), which is called the "Improving Scale Items" technique, by avoiding using vague terms or statements in each item; defining the ambiguous or difficult to understand terms for the respondents, and finally avoiding the double-barrelled questions. Also, we explained to the respondents that this questionnaire is only for academic purposes, and their data will lock and kept confidential.

Fourthly, is the geographical limitation. Hospitals are spread all over the kingdom very far apart. The Ministry of Health did not agree to distribute the questionnaire electronically, due to the lack of a unified and complete database for all hospitals; this forced the researcher to travel to Jordan and tour all over the country to collect data and conduct interviews with the hospital managers. This cast a heavy burden on the researcher but in the end, the work was successful.

Lastly, one of the limitations of this thesis is that in the second part of it (i.e., the influence of PSM on organizational performance), to measure the performance using efficiency scores via DEA, we used secondary data from the JMoH. Our panel data set were for three years (i.e., 2019, 2020, and 2021), but on the other hand, the cross-sectional data for PSM was only for one year. To avoid this issue, we justify our idea based on several original papers from the most prominent schoolers in the arena of PSM who found that PSM is has a stable nature and needs a long time to be changed (Wright & Grant, 2010; Brænder & Anderson, 2013; Kjeldsen, 2014; Vogel & Kroll, 2016; Wright & Christensen, 2021).

Despite these limitations, our study provides a preliminary link between PSM, ethical behaviour and organizational performance, in

Jordan as one of the novel studies within the context of Arabic countries and middle eastern literature.

#### **5.4 DIRECTIONS FOR FUTURE RESEARCH**

In the shadows of this study and its results and conclusions, we put a number of recommendations in the hands of scientific researchers as guidelines for future related studies that benefit from this study and its results and enrich this research field more. The most prominent of these recommendations are the following:

- 1- Further research should be undertaken to investigate by conducting an in-depth study of the PSM in the Jordanian public hospitals and in other governmental and private organizations in the Kingdom of Jordan and other countries in order to form new and deeper knowledge of the theory of PSM and how it relates to many organizational and work outcomes.
- 2- It is recommended for future researchers to add Public Values as an additional variable to the construct of PSM to study it in the context of Jordan and middle eastern environments, where this inherent administrative system could improve the scale of PSM. In another word, it would be interesting to test if the Jordanian public workers' who have public values are different from other workers as a compass to distinguish if the workers are driven by the traditional model of public administration or the managerialism-oriented model, and how this can affect their level of PSM. Also, we encourage future researchers to study public values from many different points of view, categories, and moral sets. More precisely, we stress the need to pay attention to the many possible interpretations of public values. This enlargement of possible scenarios will widen our understanding of the dark side of PSM.
- 3- Studying the influence of religion as the silent phenomena on PSM and how it affects motivated employees, which was recently found to be a key motivator for employees' PSM and ethics (Vandenabeele, et al., 2004; Johnson, et al., 2016). The reason behind this statement is that religion proved to be

associated with the stimulation of PSM and works ethics as a foundation for most religions, for instance, the Catholic Ethics (e.g., Deliverance, Egalitarianism, Authority, etc.) was found to be rotted in the morality of public service sector in the Netherlands (Wang, et al., 2020). Similarly, Kim (2009) researched the structure of PSM within the public sector in Korea, where he found that the Confucian teachings present there as a form of Authority, which shapes the commitment of the public servants. Echoing the same voice, Hassan and Ahmed (2021) studied the Islamic work ethics and the level of PSM in Iraq. Their results revealed that Islamic ethics has an influence over PSM, which indicates the importance of religion in most value-based concepts, where it is very interesting to study the influence of religious beliefs, and whether it has implications on PSM.

- 4- It is strongly recommended to study the influence of PSM on ethical behaviour mediated with ethical intention, given the importance of this mediating relationship to understand the willingness of employees to act ethically, since the arena of PSM and ethical intention is still not fully discovered.
- 5- In order to export the theory of PSM to other disciplines, it is important to have construct clarity of the scale of PSM. In this vein, we recommend studying the prosocial interventions of PSM, for the reason that it could be analogous to many prosocial behaviours (e.g., altruism, prosocial motivation).
- 6- We recommend future researchers perform a Meta-Analysis to allocate and collect the inconsistent findings, between PSM and various organizational outcomes (e.g., organizational values, job satisfaction, organizational citizenship behaviour, organizational commitment, person-organization fit, turnover intention, productivity, job engagement, etc.), this study will help us to deepen our understanding how PSM related by many organizational outcomes and identify the potential issues of publication bias.

- 7- Based on our deep studying of the PSM's construct, we are aware of the problem of *Uniformity*. So, firstly we recommend studying the construct of PSM in many contexts in the Jordanian public sector. Secondly, creating a more diverse construct to incorporate most of the mixed motives into one universal measurement, will lead to clarifying the scale of PSM and its relationship with other important key variables. Indeed, some researchers took this task upon themselves (e.g., [Coursey & Pandey, 2007](#); [Vandenabeele, 2008](#); [Kim, et al 2013](#)) after the prominent work of Perry. However, we hope our initial attempts to develop a construct that suits the Jordanian public sector reality taking into account the boundaries of Perry; will be the starting point for Jordanian and Arabic researchers to expand our knowledge regarding the clarity of the PSM scale.
- 8- Researching the role of the PSM in limiting administrative corruption in government sector organizations, and its employment mechanisms through which the organization ensures the end or reduction of job corruption - if exists.
- 9- Conducting longitudinal studies, extending over several years, to monitor the performance and ethical behaviour of employees in the same organization before and after their PSM *Cultivation*<sup>20</sup> or/and *Activation*<sup>21</sup> to test the influence in a more realistic way, that is, to determine the change in performance and ethical behaviour resulting from the public service motivated (PSM-ed) employees by considering the results of the study and others, and more precisely to analyse the causal relationships between the variables under study, taking into account the results of ([Meyer-Sahling, et al., 2019](#)), which indicates that the PSM can be activated, and this activation could reflect on public employees ethics.

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<sup>20</sup> PSM *Cultivation* refers to the fostering and increase of PSM.

<sup>21</sup> PSM *Activation* refers to the active engagement of existing levels of PSM.



- 10-That all future studies and based on the previous recommendation (n.9) take into account the division of the study sample of employees into two categories: PSM-ed employees and non-PSM-ed employees; and how that influences workers' ethical behaviour and performance.
- 11-We recommend studying the factors that affect PSM, at the individual level (e.g., Individuals Choice of Job, Pay & Rewards, Job Security, Work itself, Goal Clarity, Role Identification, Exposure to the Public Sector, Perceived Social Impact, Intrinsic Motivation, Self-Persuasion, Trust in Leaders, Individual Integrity, Conscientiousness, Gender, Job Characteristics, Material Incentives, Socialization), organizational level (e.g., Sub-Sector, Transformational Leadership, Organization Image, Recruitment Mode, Organization Structure, Accountability Mechanism, Red Tape, Ownership), and societal level (e.g., Policy Environment, Culture, State Ideology, Citizen Participation, Corruption). Nevertheless, we agree with (Zubair, et al., 2018) on the fact that PSM has an individualistic nature, where most of the factors are affected by being at the individual level.
- 12-We recommend studying the various antecedents that correlate with PSM and its dimensions, and how these antecedents change the PSM of public workers, such as demographic characteristics (i.e., Age, Sex, Education), parental socialization (i.e., Self-reliance, Accepting responsibility, Adults competent skills), religious socialization, personal attributions (i.e., Empathy, Responsibility, Thriftiness, Honesty, Flexibility), professional identification, job characteristics, religious socialization (i.e., Values, Beliefs, Attitudes), and political ideology (i.e., ethical ideals, principles, etc.).
- 13-We further recommend developing the instrument of PSM, by investigating deeper in its structure (One-dimensionality vs. Multidimensionality), assessing the issues of measurements invariance, and its internationality. Giving huge importance to

the wording of the scale items putting in mind the limitation of language when translating the original scales from one country to another. Hence, we recommend also overcoming this issue to follow back translating strategy and presenting the scale after translating to schoolers and practitioners in the same domain to validate it.

- 14-We recommend studying the influence of PSM on organizational performance from two levels, namely, the individual level via many tools (e.g., self-reported scales), and the organizational level as in our case by studying it using different techniques such as DEA based on the efficiency scores to compare them. This will open a huge door to future research to investigate this arena, where public administration meets other disciplines such as economics, and so on.
- 15-We recommend future researchers study the value composition of teams within an organization (i.e., homogenous vs. heterogeneous) teams. Based on the prior research, heterogeneous teams are preferable more than homogenous teams, because they eliminate “*Groupthink*”, which could help individuals to identify a set of values and prevent each other from doing unpreferable behaviour, such as (un)ethical behaviour, that had been interpreted wrongly (Schott & Ritz, 2018).

## 5.5 PRACTICAL IMPLICATIONS

We would like before drawing our practical implications to highlight the potential issues of the dark side of PSM to be taken into consideration by the human resource management department, and practitioners. This can be interpreted when managers try to modify ethical standers and values within the organization for PSM-ed employees; it is very important to know, what is the meaning of “*Public Interest*” for them. Indeed, this is true for the reason that individuals’ beliefs, behaviours, and even their judgment are interdependent (Nguyen & Biderman, 2008).

In light of the results obtained by the current study, we present organizations with a number of recommendations that are hoped to help decisions makers and practitioners in the Jordanian public health sector in particular and the public sector in general. Our study provides insights and useful information for the leaders in Jordanian public hospitals regarding PSM itself, for the reason that PSM is a very crucial factor in public organizations, where its importance manifests in understanding the tendency of public workers to choose to work in public organizations. Hence, it matters for decision-makers to attract, retain, and motivate suitable employees who can handle complex tasks and organizational objectives.

As we mentioned before, PSM is associated with the notion that individuals are attracted to the public service sector. If decision-makers, put this into consideration, this will enhance the quality of the internal and external recruiting process. Indeed, the individuals with high PSM levels are willing to put their self-interests aside and put the public interest at the top of their priorities. For these reasons, PSM considers one of the most important criteria for choosing employees in public service employment.

## **5.6 POLITICAL AND ECONOMIC IMPLICATIONS**

In a developing country like Jordan, the government seeks consistently to reform public administration, increasing the values of workers, reducing costs, and increasing performance in delivering services to the public. Thus, our investigation and empirical work will help to understand and shed light on this phenomenon to be under the circle of the top tier management, and their public administration strategic reform agenda.

In the end, within the economic and political circumstances of Jordan with the huge burden internally and externally, the international response to the refugee requirements has not been sufficiently large and satisfactory. In this regard, economic-wise, Jordan is still suffering from the events of the Arab Spring, as it faced a difficult situation as a result of the displacement of large numbers of refugees' brothers to Jordan, where Jordan is the second-largest country in terms of the

number of refugees compared to the number of its citizens. Therefore, it is noted that the refugee crisis and the COVID-19 pandemic have exacerbated pressure on the public sector and especially on the health sector, which has led to an impact on the health care system and restriction of services available to Jordanians.

Various paths pursued by comprehensive reform in Jordan for many years focused in their entirety on the political and economic aspects, and marginally on the public sector, which, unanimously, is considered one of the most important imbalances that exacerbated the country's financial situation. However, the public sector, needs most today is the provision of competencies, an end to *Wasta* (Favouritism) and nepotism that provided the incompetent by assuming advanced job positions, and the outcomes were negative on public performance, especially in the economic aspect. Based on the aforementioned debate, we emphasise the importance of PSM, firstly, from choosing competencies that seek to work on public organisations, not for their personal interests, and secondly to the impact of this awareness on decision-makers in many organizational outcomes.

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## APPENDICES

Appendix 1: Ethical consideration - formal letters from JMoH

**ABUGHAZALEH**  
TRANSLATION  
& COMMERCIAL SERVICES



**أبو غزالة للترجمة**  
والخدمات التجارية

(Traducción de la Lengua Árabe)

El Reino Hachemita de Jordania

Ministerio de Salud

Núm.: Moh / REC/ 2020/187

Fecha:

Decisión del Comité de Ética en Investigación Científica

Por la presente, el Comité de Ética de la Investigación Científica se reunió el 20/10/2020 para discutir y estudiar la investigación científica presentada por el estudiante de doctorado /Sr. YAZAN TAHER SHAWABKEH

Con el título:

(The Casual effect of Public Service Motivation on Ethical Behavior and performance in Public Organization : Evidence from Jordan)

En consecuencia, el comité decidió aprobar la realización de la investigación relacionada con lo anterior, respetando la ética de la investigación científica, los derechos de los pacientes y su consentimiento.

Y fue debidamente firmado por los miembros del comité.

<b>Relator del Comité</b> Jefe de la Unidad de Desarrollo de Recursos Humanos Sr. Khawla Alawneh - (fdo.)	<b>Miembro</b> Farmacéutica Sr. Hanan Sartawi - (fdo.)	<b>Miembro</b> Director de Asuntos Administrativos y Financieros Sr. Ghaleb Alqewasmi - (fdo.)	<b>Miembro</b> Especialista en Cirugía General Dr. Farouq Hamdan - (fdo.)
<b>Miembro</b> Director médico Dr. Jamal Hamdan - (fdo.)	<b>Miembro</b> Jefe del departamento interno Dr. Yousef Qdeimat - (fdo.)	<b>Miembro</b> Director de la Dirección de Laboratorio Dr. Mu'ath Badawi - (fdo.)	<b>Miembro</b> Director de la Administración de Enfermería Dr. Hani Alqudah - (fdo.)

Presidente del comité  
Director de la Administración de Hospitales de Al-Bashir  
Dr. Mahmoud Sulaiman Zreiqat  
(fdo.)



Sello Oficial

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تلفون: 46 229 10  
فاكس: 46 368 73  
حسوبي: 079 - 5214196 079 - 5283003



الرقم .....  
 التاريخ .....  
 الموافق .....

Moh/REC/2020/187

### قرار لجنة أخلاقيات البحث العلمي

اجتمعت لجنة أخلاقيات البحث العلمي بتاريخ ٢٠/١٠/٢٠٢٠ لمناقشة ودراسة البحث العلمي المقدم من قبل طالب الدكتوراه / يزن طاهر شوابكة.

بعنوان :-

### \* The Casual Effect of Public Service Motivation on Ethical Behavior and Performance in Public Organization: Evidence from Jordan \*

وبناء عليه قررت اللجنة الموافقة على اجراء البحث العائد للمذكور أعلاه مع الالتزام بأخلاقيات البحث العلمي وحقوق المرضى وموافقتهم، وتم التوقيع من قبل أعضاء اللجنة حسب الأصول.

عضو  
 أخصائي جراحه عامه  
 الدكتور / فاروق حمدان

عضو/ مدير الشؤون  
 الادارية والمالية  
 السيد/ غالب القواسمي

عضو  
 الصيدلانية  
 حنان سرطاوي

مقرر اللجنة  
 رئيس وحدة تنمية الموارد  
 البشرية/ خولة علاونة

عضو  
 مدير مديرية التمريض  
 الدكتور / هاني القضاة

عضو/ مدير  
 مديرية المختبرات  
 الدكتور / معاذ بدوي

عضو/ رئيس قسم  
 الباطني  
 الدكتور/ يوسف القديمات

عضو/ المدير الطبي  
 الدكتور/ جمال حمدان

رئيس اللجنة  
 مدير ادارة مستشفيات البشير  
 الدكتور/ محمد سليمان زريقات

الملكة الأردنية الهاشمية

عنوان: عمان ١١١١٨ الأردن، الموقع الإلكتروني: www.moh.gov.jo هاتف: ٢٢٠٢٢٠٠٠٠ فاكس: ٩٦٢٢٦ ٩٦٢٢٦ ٩٦٢٢٦

(Traducción de la Lengua Árabe)

El Reino Hachemita de Jordania

Ministerio de Salud

Núm.: desarrollo/información/9283  
Fecha: 25/10/2020



El Director del hospital .....

Saludos ...

Por la presente, adjunto una copia de la carta del Director de la Administración de los Hospitales Al-Bashir / Presidente del Comité de Ética para la Investigación Científica núm. MBA/ Comité de Ética/13341, con fecha de 22/10/2020, sobre la aprobación del estudiante de doctorado Sr. YAZAN TAHER SHAWABKEH , en la Universidad de Santiago de Compostela / España

(The Casual effect of Public Service Motivation on Ethical Behavior  
and performance in Public Organization : Evidence from Jordan )

Y eso es mediante la distribución del cuestionario adjunto (en línea) a los trabajadores de todas las categorías laborales en los hospitales gubernamentales afiliados al Ministerio de Salud.

Por favor, su amable recomendación a cualquier persona que necesite facilitar el estudio anterior, y facilitar al Comité de Ética de la Investigación Científica los resultados del estudio correspondiente a la investigación antes mencionada.

Atentamente...

Director de la Dirección de Educación y Desarrollo de Recursos Humanos  
Dra. Riham Alhmoud  
(fdo.)

Sello Oficial





وزارة الصحة

الرقم  
التاريخ  
الموافق

مدير مستشفى .....

تحية طيبة وبعد ،،،

أرفق طياً صورة عن كتاب مدير ادارة مستشفيات البشير / رئيس لجنة أخلاقيات البحث العلمي رقم م ب أ / لجنة أخلاقيات / ١٣٣٤١ تاريخ ٢٢/١٠/٢٠٢٠ بخصوص الموافقة لطالب الدكتوراة يزّن طاهر شوابكة في جامعة سانتياغو دي كومبوستيلا / اسبانيا إجراء بحث بعنوان :-

**( The Casual Effect of Public Service Motivation on Ethical Behavior and Performance in Public Organization:Evidence from Jordan )**

وذلك عن طريق توزيع الاستبيان المرفق صورة عنه (On Line) على العاملين من جميع الفئات الوظيفية في المستشفيات الحكومية التابعة لوزارة الصحة.

أرجو التكرم بالإيعاز لمن يلزم تسهيل مهمة إجراء الدراسة أعلاه ، وموافاة لجنة اخلاقيات البحث العلمي بنتائج الدراسة العائدة للبحث المذكور .

وتفضلوا بقبول فائق الاحترام ،،،

مدير مديرية التعليم وتطوير الموارد البشرية

  
الدكتورة رهام الحمود

م.م

المملكة الأردنية الهاشمية  
هاتف: ٥٢٠٠٢٣٠ +٩٦٢ ٦ ٥٦٨٨٣٧٣ فاكس: ٥٦٨٨٣٧٣ +٩٦٢ ٦ ص.ب.٨٦ عمان ١١١١٨ الأردن. الموقع الإلكتروني: www.moh.gov.jo



**ABUGHAZALEH**  
TRANSLATION  
& COMMERCIAL SERVICES



ابو غزالة للترجمة  
والخدمات التجارية

(Traducción de la Lengua Árabe)

El Reino Hachemita de Jordania

Ministerio de Salud

Núm.: desarrollo / información / 9283  
Fecha: 25/10/2020



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Saludos ...

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(The Casual effect of Public Service Motivation on Ethical Behavior  
and performance in Public Organization : Evidence from Jordan )

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Por favor, su amable recomendación a cualquier persona que necesite facilitar el estudio anterior, y facilitar al Comité de Ética de la Investigación Científica los resultados del estudio correspondiente a la investigación antes mencionada.

Atentamente,...

Director de la Dirección de Educación y Desarrollo de Recursos Humanos  
Dra. Riham Alhmoud  
(fdo.)

Sello Oficial





الرقم ٥٤٨٢ / معلومات  
التاريخ  
الموافق ٢٠٢٠/١٠/٢٥

مدير مستشفى .....

تحية طيبة وبعد ،،،

أرفق طياً صورة عن كتاب مدير ادارة مستشفيات البشير / رئيس لجنة أخلاقيات البحث العلمي رقم م ب أ / لجنة أخلاقيات / ١٣٣٤١ تاريخ ٢٠٢٠/١٠/٢٢ بخصوص الموافقة لطالب الدكتوراة بزىن ظاهر شوايكة في جامعة سانتياغو دي كومبوستيلا / اسبانيا إجراء بحث بعنوان :-

**( The Casual Effect of Public Service Motivation on Ethical Behavior and Performance in Public Organization: Evidence from Jordan )**

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أرجو التكرم بالإيعاز لمن يلزم تسهيل مهمة إجراء الدراسة أعلاه ، وموافقة لجنة أخلاقيات البحث العلمي بنتائج الدراسة العائدة للبحث المذكور .

وتفضلوا بقبول فائق الاحترام ،،،

مدير مديرية التعليم وتطوير الموارد البشرية

الدكتورة رهام الحمود

هـ م



Appendix 2: Questionnaire



Dear Participant,

I invite you to participate in a research study that I am currently doing in the Economic and Business program at Spain in the **University of Santiago de Compostela**, where I am in the process of writing my PhD dissertation.

Your participation in this research is completely voluntary. You may decline altogether or leave blank any questions you do not wish to answer. There are no known risks to participation beyond those encountered in everyday life.

**Your responses will remain confidential and anonymous.** Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to this questionnaire.

If you agree to participate in this research, please answer the questions on the questionnaire as best you can. It should take approximately (10) minutes to complete.

If you have any questions about this research, feel free to contact the researcher.

Thank you for your assistance in this important endeavor.

Sincerely yours,

Yazan Taher Shawabkeh

**Part one: Demographic Factors**

<b>Sex/Gender</b>	Male ( )		Female ( )	
	Prefer not say ( )			
<b>Age</b>	Less than 25 ( )	From 25 to 35 ( )	From 36 to 45 ( )	
	From 46 to 55 ( )	From 56 to 65 ( )	From 66 and above ( )	
<b>Educational Level</b>	Associate degree ( )	Bachelor's degree ( )	Master's degree ( )	
	Doctorate degree ( )			
<b>Organisational statuses</b>	<b>Do you supervise employees?</b>			
	Yes ( )		No ( )	
<b>Years of experience in current job position</b>	5 years or less ( )	From 6 to 11 years ( )	From 12 to 16 years ( )	
	From 17 years and above ( )			
<b>Name of the hospital</b>	.....			

**Part two: Public Service Motivation**

Sentence/Item	The agree degree				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
<b>2.0 Public Service Motivation</b>					
<b>2.1 Attraction to Public Service (APS)</b>					
Helping to improve the public service is one of the concerns that prevail among the hospital employees					
I support people who initiate or participate in activities that tackle social problems, contribute to the common good and help my community					
My desire to work in public healthcare sector mainly because of the stability in employment, job security and salary conditions					
I believe that working in the public sector is attractive only to individuals with limited opportunities in the private sector					
Working in a public hospital instead of a private hospital is a desire, even if it includes less advantages					
<b>2.2 Self-Sacrifice (SS)</b>					
I consider putting civic duty before my self is a vital role for public healthcare sector workers					
Much of what I do is for a cause bigger than me as an employee in the hospital					
I would agree to an effective plan to make a better life for society and the less fortunate people, even if it will cost me personal loss, or time, money, and effort					

If my manager does not reward my commitment, I believe that there is no reason to make any extra effort					
<b>2.3 Compassion (COM)</b>					
To me, helping people who are in trouble, or who are treated unfairly, is very important					
I seldom think about the welfare of other people whom I do not know personally					
I have little compassion for people in need who are unwilling to take the first step to help themselves					
<b>2.4 Commitment to Public Values (CPV)</b>					
I believe that it is important that public employee account for all the cost/expenses they make					
To me, serving public interests is more important than helping other people					
My mission is not asking about activities legitimacy but simply do the job					
I think that what is really matters in this work is expertise, not ethics					

**Part three: Ethical Behavior**

Sentence/Item	The agree degree				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
<b>3.0 Ethical Behavior</b>					
<b>3.1 Ethical behavior of self</b>					
It is acceptable for me to take office supplies home					
In order to get ahead in my future career, I believe that one has sometimes to compromise personal ethical standards					
I believe that it is acceptable on occasion to discuss aspects of cases with friends and others not employed within their organization					
I believe that it is okay to by-pass established protocols in order to be more efficient or effective at work					
I believe that it is acceptable to make personal calls at work					
<b>3.2 Ethical behavior of co-workers</b>					
My co-workers feel that it is acceptable to take office supplies home					
In order to get ahead in their future careers, my co-workers believe that one has to compromise personal ethical standards					
My co-workers believe that it is acceptable on occasion to discuss aspects of cases with friends and others not					



employed within their organization					
My co-workers believe that it is okay to by-pass established protocols in order to be more efficient or effective at work					
My co-workers believe that it is acceptable to make personal calls at work					
<b>3.3 Ethical Leadership</b>					
My supervisor keeps his/her actions consistent with his/her stated values					
My supervisor shows a strong concern for ethical and moral values					
My supervisor sets an example of ethical behavior in his/her decisions and actions					
My supervisor is honest and can be trusted to tell the truth					
My supervisor holds employees accountable for using ethical practices in their work					
My supervisor insists on doing what is fair and ethical even when it is not easy					
My supervisor opposes the use of unethical practices to increase performance					
My supervisor regards honesty and integrity as important personal values					

**Part four: Overclaiming scales**  
**1=Not familiar at all, 5= Very familiar**

Sentence/Item	The familiarity degree				
	1	2	3	4	5
<b>How familiar are you with each of the following movies?</b> 1- Titanic 2- Muna's Life					
<b>How familiar are you with each of the following products?</b> 1- Zaetoneh 2- Al-Kaseeh					
<b>How familiar are you with each of the following TV series?</b> 1- Tash ma Tash 2- Amman Nights					
<b>How familiar are you with each of the following designer labels?</b> 1- Lavashka 2- Zara					

Appendix 3: Questionnaire arbitrators

N.o	Name	Workplace	Discipline	Area	Academic Degree/Title
1	José Caamaño Alegre (Supervisor)	University of Santiago de Compostela	Public Administration, Law, Economic, and Finance.	Applied Economics	Associate Professor
2	Ferreiro Seoane Francisco Jesus	University of Santiago de Compostela/ Universidade de a Coruña	Public Administration and public policy	Applied Economics	Assistant Professor
3	Mohammed Abdulaal Al-Nuaimi	University of Jordan	Statistics	Applied statistics/ Total Quality Management	Prof. Dr
4	Awad Tarawneh	University of Jordan	Curriculum and methods	Educational sciences	Associate Professor
5	Jawaher Al Ghuwairi	University of Jordan	Science methods curricula	Curriculum and teaching	Associate Professor
6	Khawla Alawneh	JMoH*	Public Administration	Human Resource Management	Head of human resource development unit
7	Ghaleb Al-Qawasmi	JMoH	Public Finance	Public Finance	Director of Administration and Financial Affairs
8	Farouk Hamdan	JMoH	Doctor	General surgery specialist	Member of the Scientific Research Ethics Committee
9	Jamal Hamdan	JMoH	Doctor	Medical Director	Member of the Scientific Research Ethics Committee
10	Yusuf Al-Qeddimat	JMoH	Doctor	Proctologist	Head of the proctology department
11	Moa'ath Badawi	JMoH	Doctor	Specialty doctor	Medical laboratory manager
12	Hani Al-Qudah	JMoH	Doctor	Specialty doctor	Director of Nursing Director

13	Mahmoud Zureikat	JMoH	Doctor	-	Director of the Directorate of Administration of Al-Bashir Hospitals/ Head of the Scientific Research Ethics Committee
14	Reham Al-Hamoud	JMoH	Professor	Pharmaceutical	Director of Education and Human Resource Development



**Annexure 1: bibliometric analysis search syntax**

TITLE ( "public service motivation" ) AND ( LIMIT-TO ( SUBJAREA , "SOCT" ) OR LIMIT-TO ( SUBJAREA , "SOCT" ) OR LIMIT-TO ( SUBJAREA , "PSYC" ) OR LIMIT-TO ( SUBJAREA , "BUSI" ) OR LIMIT-TO ( SUBJAREA , "PSYC" ) OR LIMIT-TO ( SUBJAREA , "MEDI" ) OR LIMIT-TO ( SUBJAREA , "ECON" ) OR LIMIT-TO ( SUBJAREA , "ENVI" ) OR LIMIT-TO ( SUBJAREA , "ARTS" ) OR LIMIT-TO ( SUBJAREA , "DECI" ) OR LIMIT-TO ( SUBJAREA , "HEAL" )) AND ( LIMIT-TO ( EXACTKEYWORD , "Public Service Motivation" ) OR LIMIT-TO ( EXACTKEYWORD , "Motivation" ) OR LIMIT-TO ( EXACTKEYWORD , "Job Satisfaction" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Sector" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Service" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Administration" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Management" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Service Motivation (PSM)" ) OR LIMIT-TO ( EXACTKEYWORD , "Leadership" ) OR LIMIT-TO ( EXACTKEYWORD , "Organizational Commitment" ) OR LIMIT-TO ( EXACTKEYWORD , "Performance" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Service Motivations" ) OR LIMIT-TO ( EXACTKEYWORD , "Transformational Leadership" ) OR LIMIT-TO ( EXACTKEYWORD , "Altruism" ) OR LIMIT-TO ( EXACTKEYWORD , "Civil Service" ) OR LIMIT-TO ( EXACTKEYWORD , "Private Sector" ) OR LIMIT-TO ( EXACTKEYWORD , "Employee Motivation" ) OR LIMIT-TO ( EXACTKEYWORD , "Ethics" ) OR LIMIT-TO ( EXACTKEYWORD , "Organizational Behavior" ) OR LIMIT-TO ( EXACTKEYWORD , "Organizational Citizenship Behavior" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Hospital" ) OR LIMIT-TO ( EXACTKEYWORD , "Structural Equation Modeling" ) OR LIMIT-TO ( EXACTKEYWORD , "Work Motivation" ) OR LIMIT-TO ( EXACTKEYWORD , "Confirmatory Factor Analysis" ) OR LIMIT-TO ( EXACTKEYWORD , "Health Care Personnel" ) OR LIMIT-TO ( EXACTKEYWORD , "Job Performance" ) OR LIMIT-TO ( EXACTKEYWORD , "Performance Assessment" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Employees" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Sector Organizations" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Services" ) OR LIMIT-TO ( EXACTKEYWORD , "Burnout" ) OR LIMIT-TO ( EXACTKEYWORD , "Civil Servant" ) OR LIMIT-TO ( EXACTKEYWORD , "Decision Making" ) OR LIMIT-TO ( EXACTKEYWORD , "Health Care" ) OR LIMIT-TO ( EXACTKEYWORD , "Health Personnel" ) OR LIMIT-TO ( EXACTKEYWORD , "Health Worker" ) OR LIMIT-TO ( EXACTKEYWORD , "Hospitals, Public" ) OR LIMIT-TO ( EXACTKEYWORD , "Organizational Culture" ) OR LIMIT-TO ( EXACTKEYWORD , "Organizational Performance" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Sector Motivation" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Values" ) OR LIMIT-TO ( EXACTKEYWORD , "Prosocial Behavior" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Policy" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Sector Management" ) OR LIMIT-TO ( EXACTKEYWORD , "Public Sector Reform" ) OR LIMIT-TO ( EXACTKEYWORD , "Bibliometrics" ) OR LIMIT-TO ( EXACTKEYWORD , "Citizenship" ) OR LIMIT-TO ( EXACTKEYWORD , "Civil Servants" ) OR LIMIT-TO ( EXACTKEYWORD , "Commitment" ) OR LIMIT-TO ( EXACTKEYWORD , "Commitment To Public Interest" ) OR LIMIT-TO ( EXACTKEYWORD , "Corruption" ) )



The Hashemite Kingdom of Jordan (HKJ) faces internal and external challenges and hazards that pose significant encounters for HKJ. Such challenges cast a heavy shadow on several public sectors, the most important of which is the public health sector. However, this dissertation aimed to investigate the influence of Public Service Motivation on Ethical behaviour and Organizational Performance in Jordanian public hospitals. This dissertation had been divided into two folds that filled numerous flagrant gaps in the arena of PSM. In the first fold, we investigated the influence of PSM on Ethical Behavior using three-level models via SEM. In the second fold, we contribute to the methodological linking between PSM and Organizational Performance using econometric techniques instead of a survey-based method.