

# **Implementation of TQM, Service Innovation, and Risk Management in the Public Services Sector: The Case of Ministry of Industry Indonesia**

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## **Abstract**

Public services in Indonesia are currently facing challenges to meet the increasing expectations of the public amid limitations in budgetary resources, human capital, and institutional capacity. Public services provided by the Ministry of Industry implement Total Quality Management (TQM) and service innovation to enhance service quality, as well as risk management to achieve organizational goals and objectives. This study aims to investigate the structural relationship between TQM, Service Innovation, and Risk Management on the organizational performance of the public sector within the Ministry of Industry. Data collection was conducted through an online survey of 23 public service units within the Ministry of Industry, resulting in 316 collected responses. The data were analyzed using Structural Equation Modeling (SEM). The findings indicate that the implementation of TQM, service innovation, and risk management in the Ministry of Industry's service units positively and significantly influences organizational performance, aligning with theoretical literature. The most influential dimensions of TQM are culture, processes, and human resources, while leadership is identified as an area needing improvement. Service innovation and risk management act as partial mediation in influencing the relationship between TQM and organizational performance. The research findings are expected to provide guidance for managers and stakeholders in enhancing operational effectiveness and overall performance of public service organizations in the industrial sector. Additionally, this study contributes to academic literature in the fields of organizational management and the public sector by presenting empirical evidence on the relationships between TQM, service innovation, risk management, and organizational performance.

## **Keywords**

Total Quality Management, Service Innovation, Risk Management, Public Services Sector, Organizational Performance.

## **1. Introduction**

The provision of public services in Indonesia is based on the regulations stipulated in Law Number 25 of 2009 concerning public services. The implementation of public service systems must adhere to the general principles of good governance and corporate governance, including elements of professionalism, transparency, accountability, timeliness, speed, ease, and affordability (Pemerintah Republik Indonesia, 2009). The government strives to provide quality services according to the needs of the community, as good public services positively impact the satisfaction and trust of the public in the government (Lanin & Hermanto, 2019; Lestariningsih et al., 2018). However, achieving public satisfaction is challenging due to continuously rising public expectations amidst limited resources (Mättö, 2019). Evaluating the quality of public services is crucial for assessing public satisfaction (Van Ryzin, 2006), yet the supervisory body overseeing public service administration in Indonesia (Ombudsman) reported 8,292 complaints from the public alleging maladministration in public services throughout Indonesia in 2022 (Ombudsman Republik Indonesia, 2022). These allegations included violations of procedures, abuse of authority, discrimination, and others. Pribadi (2021) stated that factors such as service quality, accountability, work culture, and service performance influence public satisfaction, emphasizing the need for the government to consider these various factors in providing public services according to the needs of the community and existing laws.

Public service organizing organizations are obligated to provide public services in accordance with their established objectives, covering the implementation of services, managing public complaints, information management, internal

supervision, community education, and consultation services (Pemerintah Republik Indonesia, 2009). The scope of public services includes public goods, public services, and administrative services. One state organizing institution with the main task and function of providing public services is the Ministry of Industry based on Minister of Industry Regulation Number 34 of 2010 (Kementerian Perindustrian, 2010). The types of services provided include certification services (comprising product certification, quality management system, and personnel certification), testing services (including materials, products, and engineering goods), machine and laboratory calibration, technical inspection, and other services (including operational technical training, technical consultation, design and engineering, and pollution control).

In an effort to provide good quality public services, the government establishes several other rules that must be implemented by public service organizing organizations. According to Law Number 20 of 2014, testing, inspection, and certification activities must be carried out in accordance with internationally recognized competence requirements (Pemerintah Republik Indonesia, 2014). This indicates that public service activities must implement a management system to ensure their quality. Therefore, testing and calibration activities must be accredited with ISO 17025, certification must be accredited with ISO 17065, and inspection must be accredited with ISO 17020. In addition, based on the Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform (PAN-RB) Number 91 of 2021, public service organizers must implement innovation to improve performance and maintain the quality of sustainable service and innovation (KEMENPAN-RB, 2021). Finally, as part of the government organization, public service organizing organizations are required to implement the Government Internal Control System (SPIP) based on Government Regulation Number 60 of 2008. This system is guided by ISO 31000 and integrates actions and activities carried out continuously by leaders and all employees to provide adequate confidence in achieving organizational goals through effective and efficient activities, reliable financial reporting, securing state assets, and compliance with laws and regulations (Pemerintah Republik Indonesia, 2008).

There are various theories developed to address the challenges of public services in providing quality service despite limited resources. Firstly, the implementation of a management system throughout the organization is known as Total Quality Management (TQM). TQM is an effective management strategy in improving the quality of products and services in the face of increasing business competition and the growing needs of society (Abbas & Sağsan, 2019; Li et al., 2018). TQM provides a competitive advantage for organizations, not only in terms of financial benefits but also by enhancing employee and customer satisfaction through the provision of quality products and services (Shafiq et al., 2019). Currently, TQM is considered a key factor in the success of manufacturing and service industries, bringing benefits such as customer satisfaction, reliability, productivity, market dominance, organizational innovation, competitive advantage, and the adoption of new organizational culture (Lepistö et al., 2022; Nasim, 2018). Although initially focused on the manufacturing sector, TQM can also be applied in the service (Bouranta et al., 2019) and public sectors (HM et al., 2022).

Secondly, public sector innovation is crucial in efforts to enhance public satisfaction, service quality, and community participation (Pradana et al., 2022; Sousa et al., 2015). Innovation, as defined by Schumpeter in 2003, involves truly different changes in terms of quality, methods, processes, and market coverage (Kusumasari et al., 2019). The innovation process, according to Bason (Bason, 2018), involves generating the best ideas that are effectively implemented to benefit the public. The interaction among stakeholders such as humans, budget, and knowledge plays a significant role in the emergence of innovation (Bekkers & Tummers, 2018). Evolving innovation theories encompass concepts like collaborative innovation, social innovation, organizational innovation, and public sector service innovation (Osborne & Brown, 2011; Sousa et al., 2015). Systematically structured service innovation through policies regulating interactions between the government and the public is expected to maintain the quality of public services with the goal of improving societal well-being and addressing socio-economic challenges (Mergel & Desouza, 2013; Sousa et al., 2015). In the context of the public sector, innovation can be oriented towards process improvement through quality enhancement methods or the development of services aligned with resources, user needs, and creativity (Ali AlShehail et al., 2022; Putri & Mutiarin, 2018). This innovation is anticipated to provide opportunities for improving service quality, productivity, and efficiency without requiring an increase in budget allocation (Andhika, 2018).

Thirdly, the implementation of risk management as a characteristic of good organizational governance is essential for the public sector organizations, as it helps reduce potential losses due to fraudulent actions, enhances accountability, transparency, public services, and decision-making (Ginting et al., 2023; Hinna et al., 2018). Risk management involves identifying all potential uncertainties in achieving strategic objectives through mitigation and exploitation

efforts (Moloi, 2016). Mitigation is used to address negative uncertainties, while exploitation is directed towards leveraging positive uncertainties as opportunities in achieving objectives. Initially widely applied in the private sector, risk management is now increasingly crucial in public sector organizations facing complex situations (Ahmeti & Vladi, 2017; Ginting et al., 2023). Public sector organizations can adopt well-organized methods and strategies from the private sector to address existing risks. Despite differences in complexity due to the large organizational size and bureaucratic processes, the implementation of risk management strategies in the public sector has the potential to enhance financial management (Ahmeti & Vladi, 2017; Gani et al., 2020).

Regarding these three aspects, research on the combined impact of implementing TQM, service innovation, and risk management on organizational performance in the public sector, especially in Indonesia, has not been conducted. This has become an interesting topic for the author to explore, aiming to understand the variables that have the most significant influence on the performance of public sector organizations and the opportunities for improvement.

### **1.1 Objectives**

This study aims to investigate the structural relationship between TQM, service innovation, risk management, and organizational performance in the public sector in Indonesia, specifically focusing on organizations providing public services within the Ministry of Industry. The findings of this study will serve as a foundation for developing strategies to enhance the performance of public service organizations in Indonesia, with the ultimate goal of achieving public satisfaction and trust in the government.

## **2. Literature Review**

The implementation of TQM in the sector is crucial for providing effective and efficient service quality, reducing operational costs, and enhancing productivity. By implementing TQM, the government can create organizations that are adaptive, responsive, and oriented towards public satisfaction, overcoming resource limitations, and meeting the evolving needs of society. However, the success of TQM implementation requires a supportive model and effective implementation, as well as a conducive environment. Various studies have been conducted to explore the relationship between TQM factors and organizational performance. TQM has a strong positive impact on organizational performance in case studies of textile companies (Shafiq et al., 2019). Similarly, research by Singh et al. (2018) found that TQM implementation significantly influences organizational performance in manufacturing and service companies. Research by Hummour et al. (2018) also found that TQM can be reliably applied in public service organizations and positively influences performance quality. Studies on the relationship between TQM and organizational performance have expanded to consider other factors that may affect organizational performance, such as big data management (Kim, 2020), knowledge management (Abbas, 2020), technology management integration (Tasleem et al., 2019), and structural barriers (Khalaf & Salem, 2018).

Innovation in the public sector emerged as a government response to address society's demands for the provision of high-quality services with limited resources, prompting the government to continually enhance its capacity and think creatively (Anttiroiko et al., 2011). Several empirical studies have investigated the relationship between TQM and service innovation, revealing that quality practices can enhance service innovation (Khan & Naeem, 2018). Research conducted by Ali AlShehail et al. (2022) involved the relationship between TQM and service innovation on the sustainable performance of the public sector organization, finding that the implementation of TQM has a greater influence on the social and environmental aspects of public sector organizational performance than on the economic aspect. Other studies also assert that innovation plays a role in both public and private sector services. Mättö (2019) in his research stated that innovation in the public sector is formed through quality improvement-oriented processes, indicating that the implementation of TQM stimulates innovation through process improvement. Consistent with the findings of Tsai & Wang's (2017) study in service sector companies, innovation and market orientation significantly drive company performance.

The framework and practices of risk management in the public sector began in the 1980s as part of modernization efforts created by the New Public Management theory (Bracci et al., 2021; Lapsley, 2009). The concept of risk management in the public sector was initially seen as a target and a quantifiable process within the legal framework of uncertainty. However, since risk management is considered a tool that can support policy choices and decision-making, the concept of risk management has evolved into a process that considers immeasurable uncertainty and unknown risks (Mikes, 2011; Power, 2009; Spira & Page, 2003). Countries such as Australia, New Zealand, the UK, and Canada have implemented effective risk management frameworks in their public sectors (Bui et al., 2019; Rana(1

et al., 2019). Research on risk management in the public sector has evolved over time, encompassing the impact and spread of formal and informal risk management practices (Carlsson-Wall et al., 2019), the integration of risk management into organizational processes (Rana(2) et al., 2019), and contingency factors affecting risk management (Subramaniam et al., 2011). The New Public Management theory, as a form of public sector reform that emerged in the 1990s, focuses on improving public sector performance. This concept includes risk management as part of governance and control systems and as part of efforts to enhance efficiency and effectiveness. Service provision under this concept focuses on delivering services that are more affordable, more tailored to societal conditions, and of higher quality. Success in implementing this concept contributes to reducing public deficits (Hinna et al., 2018). Another study conducted by Lepistö et al. (2022) investigated the relationship between the implementation of TQM and risk management, digitization, stakeholder management, and system deployment. This research found that risk management and stakeholder management facilitate the relationship between TQM and company profitability in specific TQM dimensions.

Previous studies have found significant relationships between TQM practices, service innovation, and risk management, each influencing organizational performance. Other research has also found that TQM promotes innovation and aids in the better implementation of risk management in organizations. Several studies have additionally identified that innovation and risk management mediate the relationship between TQM and organizational performance. The findings from these studies will serve as the foundation for developing hypotheses, as outlined in Table 1.

Table 1. Research on the relationship between TQM, innovation, risk management and Organizational Performance

No	Relationship	Author (s)	Result
1	TQM and Organizational Performances	(Ali AlShehail et al., 2022)	TQM practices in the public service sector have a greater impact on sustainable performance in social and environmental aspects.
		(Al-Dhaafri & Alosani, 2021)	The implementation of TQM has a positive and significant impact on the performance of public sector organizations.
		(Sharma & Modgil, 2020)	Implementing TQM has a direct impact on operational performance.
		(Hummour et al., 2018)	TQM practices influence quality performance positively through the dimensions of communication, employee involvement, and continuous improvement.
		(Mosadeghrad, 2014)	Adequate education and training, consistent top management support, supportive leadership, employee involvement, process management, customer focus, and continuous process improvement are determining factors for the success of implementing TQM, thereby improving operational and organizational performance.
2	TQM and Service Innovation	(Ali AlShehail et al., 2022)	TQM positively influences service innovation in public sector organizations.
		(Khan & Naem, 2018)	Hard and soft TQM practices have a positive impact on service innovation
		(Zehir et al., 2012)	Soft TQM practices in the dimensions of employee management and customer focus have a significant positive impact on innovation performance
		(Zeng et al., 2015)	Hard TQM practices when reinforced with other quality practices have a positive impact on innovation performance.
3	TQM and Risk Management	(El Khatib et al., 2020)	TQM practices are able to increase risk management capacity thereby increasing operational and economic resilience.
		(Al-Geelawee & Mohammed, 2016)	TQM practices in the dimensions of top management support, continuous improvement, and training and education have a significant impact on risk management.
4	Service Innovation and	(Ali AlShehail et al., 2022)	Service innovation positively influences the sustainable performance of public sector organizations.

	Organizational Performance	(Aas & Pedersen, 2011)	Service innovation has the ability to improve financial performance which is reflected in improving operational performance results, reducing operational costs, increasing productivity and increasing profitability.
5	Risk Management and Organizational Performance	(Durst et al., 2019)	Risk management has a positive influence on organizational success, sustainability, growth, innovation and agility of private and public sector organizations
		(Brătianu et al., 2020)	Risk management has an impact on the company's organizational performance and this performance significantly influences the company's sustainability.
6	TQM, Service Innovation, and Organizational Performance	(Ali AlShehail et al., 2022)	Service innovation mediates the relationship between TQM implementation and organizational sustainable performance.
		(Hussain et al., 2020)	TQM practices are significantly related to organizational innovation and operational performance.
		(Khan & Naeem, 2018)	Service innovation mediates the relationship between soft and hard TQM practices and organizational performance
7	TQM, Risk Management, and Organizational Performance	(Lepistö et al., 2022)	Risk management facilitates the relationship between TQM in the continuous improvement dimension and profitability

### 3. Methods

Main method used in this research is Structural Equation Modeling (SEM) Partial Least Square (PLS). SEM-PLS are multivariate analysis method that is used to analyze the relationship between observed variables (indicators) and variables that cannot be measured (latent) simultaneously (Hair et al., 2021). All indicators, dimensions, and variables determined in this research will be analyzed consisting of measurement model evaluation, structural model evaluation, and the power of study based on Hair (2019) and Wetzels et al (2009). SEM testing was carried out using SMART PLS 3 software. The research method adopts previous research from Abbas (2020), Ali AlShehail et al. (2022), Alkhalidi & Abdallah (2022), dan Khan & Naeem (2018).

In this research, the conceptual model is based on the main literature research results of Ali AlShehail et al (2022) and Lepistö et al (2022). In their research, the latent variables determined are TQM, service innovation, and sustainable performance of the public sector. Ali AlShehail et al (2022) conclude that TQM positively and significantly influence to sustainable performance of the public sector that is mediated by service innovation. Lepistö et al., (2022) using TQM, risk management and organization performance as latent variable find that risk management mediate relation between some of TQM dimensions and organization performance. From literature review, performance of public sector organization not only influence by TQM but also service innovation and risk management. Therefore, the conceptual model makes service innovation and risk management as latent variable that mediate TQM and performance of public sector organization as showed in Fig. 1. The conceptual model builds in accordance with path diagram predictions based on theoretical relationships between variables (Hair et al., 2019).

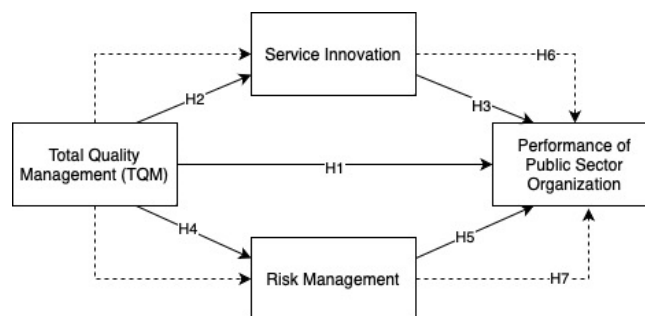


Figure 1. Conceptual Model

Based on the conceptual model in Figure 1, we have hypothesis as following:

- H1 : TQM significantly influence Performance of Public Sector Organization
- H2 : TQM significantly influence Service Innovation in Public Sector Organization
- H3 : Service Innovation significantly influence Performance of Public Sector Organization
- H4 : TQM significantly influence Risk Management in Public Sector Organization
- H5 : Risk Management significantly influence Performance of Public Sector Organization
- H6 : Service Innovation mediate relationship between TQM and Performance of Public Sector Organization
- H7 : Risk Management mediate relationship between TQM and Performance of Public Sector Organization

Conceptual model from Fig. 1 shows that TQM, Service Innovation, Risk Management and Performance of Public Sector Organization is determined as latent variable. Latent variable need representation from dimension or indicator that can be measure directly. Form literature study, dimension of TQM based on dimension from MBNQA (Fatima & Mahaboob, 2018), EFQM (Pidd, 2012) or ADAEP (Ali AlShehail et al., 2022) as key factor to implement TQM. Measurement of service innovation based on organization innovation and process innovation as dimension that significantly influence performance organization (Sousa et al., 2015). Lastly, risk management dimension based on literature study. Table 2 shows latent variable, dimension, and indicator for this research.

Table 2. Latent variable, dimension, and indicator

Dimension	Indicator	Code
<b>Latent Variable 1: Total Quality Management</b>		<b>TQM</b>
<b>Leadership (LDS)</b> (Abbas, 2020; Ali AlShehail et al., 2022; Androwis et al., 2018; Ooi, 2015)	Responsible to improvement and quality assurance	LDS1
	Focus on target, efforts, and quality planning while considering time and costs.	LDS 2
	Understanding service quality improvement can improve organization performance	LDS 3
	Evaluate and improve management system and quality	LDS4
	Manage adequate resources for employee education and training	LDS5
<b>People (HRD)</b> (Ali AlShehail et al., 2022; Shafiq et al., 2019)	Have official process to gather employee view and opinion	HRD1
	Conduct specific training about quality for employee	HRD2
	Encourage employee to improve knowledge and skills.	HRD3
	Considering team work as general practice in organization	HRD4
	Encourage employee to give opinions and suggestions in organizational activities.	HRD5
<b>Policy and Strategy (PST)</b> (Abbas, 2020; Ali AlShehail et al., 2022)	Establish quality vision and mission	PST1
	Communicate vision and mission to stakeholders.	PST2
	Structured planning process on determination and review short term and long-term objectives.	PST3
	Engaging all stakeholders to policy and objective of organization	PST4
	Have written statement about strategy which include all business operation unit	PST5
<b>Partnership and Resources (PTR)</b> (Ali AlShehail et al., 2022; Shafiq et al., 2019)	Encourage supplier to develop long-term partnership	PTR1
	Quality above cost when arranging purchase agreement with supplier	PTR2
	Evaluate supplier performance periodically	PTR3
	Update information and resources to all employee to conduct their assignment	PTR4
<b>Process (PRS)</b> (Abbas, 2020; Ali AlShehail et al., 2022)	Clear allocation of process, ownership, and responsibility	PRS1
	Assure perfect product and service design and process control	PRS2
	Continuous improvement trough self-inspection and automation.	PRS3
	Standard process instruction given to employee	PRS4
	Program to find time and cost waste on internal process	PRS5
<b>Customer Focus (CST)</b> (Lepistö et al., 2022)	Procedure on consumer satisfaction evaluation	CST1
	Customer satisfied	CST2
	Customer satisfaction analysis periodically	CST3

Dimension	Indicator	Code
	Action plan development to improve customer satisfaction	CST4
<b>Knowledge Management (KNM)</b> (Ali AlShehail et al., 2022; Shafiq et al., 2019)	Cooperation agreement with other companies, university, technical university are made.	KNM1
	Encourage employee to join formal or informal network made by people outside organization	KNM2
	Meeting periodically to inform all employee about current innovation in company	KNM3
	Have individual to responsible to gather, compile, and distribute employee suggestion internally	KNM4
	Organization develops internal rotation program to facilitate movement of employee form one division or function to another	KNM5
	Organization offers other opportunities for learning (visits to other division of the organization, internal training program, etc.) to make individual aware of duties of other people or parts	KNM6
<b>Culture (CLT)</b> (Valmohammadi & Roshanzamir, 2015)	Organization is very controlled and structured. Formal procedures generally regulate what people do	CLT1
	Leadership in organization generally consider as example of coordination efficiency, organizing or efficiency	CLT2
	Management styles in organization are characterized by job security, conformity, predictability, and relationship stability.	CLT3
	The glue that holds an organization together is formal rules and policies. Maintaining organization smoothness is important.	CLT4
	Organization emphasizes stability and unchangeability. Operational efficiency, control and smoothness is important	CLT5
<b>Latent Variable 2: Service Innovation</b>		<b>INO</b>
<b>Product and Process (INOP)</b> (Aas & Pedersen, 2011; Ali AlShehail et al., 2022)	Develop new kind of service	INOP1
	Develop new method in services	INOP2
	Introduction to new method in logistic, delivery or service distribution	INOP3
	Program to find waste on time and cost in internal process	INOP4
<b>Organization (INOO)</b> (Aas & Pedersen, 2011; Ali AlShehail et al., 2022)	Cooperation agreement with other companies, universities, technical university	INOO1
	Encourage employee to join formal or informal network made by people outside organization	INOO2
	Meeting periodically to inform all employee about current innovation in company	INOO3
	Have individual to responsible to gather, compile, and distribute employee suggestion internally	INOO4
<b>Latent Variable 3: Risk Management</b>		<b>RM</b>
(Lepistö et al., 2022)	Risk knowledge on public service process	RM1
	Risk assessment periodically	RM2
	Review systematically corrective action related to risk	RM3
	Action to address risk in process/product services	RM4
<b>Latent Variable 4 : Public Sector Organizational Performance</b>		<b>PSOP</b>
Based on Ministry of State Apparatus Utilization and Bureaucratic Reform Regulation No 14 Year 2017 (KEMENPAN-RB, 2017)	Service requirement	PSOP1
	System, mechanism and procedure	PSOP2
	Completion Time	PSOP3
	Costs/Tariff	PSOP4
	Product specification type of services	PSOP5
	Employee competency	PSOP6
	Employee attitude	PSOP7
	Handling complaints, suggestion, and feedback	PSOP8
Facilities and infrastructure	PSOP9	

#### 4. Data Collection

The population in this study was 23 public service organizations at the Ministry of Industry in all over Indonesia. Sampling technique using purposive random sampling, where respondent is randomly chosen from total population of Ministry of Industry employee in public service. Total question is 62 in likert scale ranging from very disagree=1, disagree=2, neutral=3, agree=4 and very agree=5. Data collection was carried out in October 2023 and getting 316 data that is completed and can be used. Sampling is divided into two steps, first pre-survey and then survey. Pre-survey is conducted to test validity and reliability of questionnaire statistically. Validity and reliability test conducted on first 40 respondent. The result of Validity and reliability test show that all indicator (60 items) in TQM, Service Innovation, Risk Management, and Performance of Public Sector Organization is valid (value above 0.312) and reliable (see Table 3). Demographic data from the respondent is shown in Table 4.

Table 3. Validity and reliability test

Variable	Number of Indicator	Correlation	Cronbach's alpha
TQM	39	0.455 – 0.861	0.977
INO	8	0.850 – 0.900	0.935
MR	4	0.877 – 0.964	0.940
PSOP	9	0.609 – 0.923	0.935

Table 4. Demographic data

	Sum	(%)		Sum	(%)
Location	<b>316</b>	<b>100</b>	Education	<b>316</b>	<b>100</b>
Java	174	55,1	Graduate	156	49,4
Sumatera	70	22,2	Post Graduate	94	29,7
Borneo	41	13	Diploma	50	15,8
Sulawesi	18	5,7	High School	16	5,1
Maluku	13	4,1			
Gender	<b>316</b>	<b>100</b>	Experience	<b>316</b>	<b>100</b>
Man	181	57,3	0-5 year	141	44,6
Women	135	42,7	6-10 year	60	19
Title	<b>316</b>	<b>100</b>	11-15 year	47	14,9
Employee	254	80,4	> 15 year	68	21,5
Operational Manager	55	17,4			
Top Management	7	2,2			

#### 5. Results and Discussion

##### 5.1 Measurement Model Evaluation

In Structural Equation Modeling (SEM) analysis, the evaluation of measurement models is conducted to assess the validity and reliability of indicators in measuring latent variables (Hair et al., 2019). The structural model approach utilized in this research is the repeated indicator approach, where measurement evaluation is conducted at the indicator level (first order) and dimension level (second order). Statistical parameters used in the evaluation of measurement models in SEM include outer loading, Cronbach's Alpha, composite reliability, convergent validity, and discriminant validity. Outer loading is utilized to assess the extent to which indicators reflect the measurement of variables, with a recommended minimum value of 0.60 (Chin, 1998). Cronbach's Alpha is employed to measure the consistency of interval variables and the reliability of variables measured by indicators, with a recommended minimum value of 0.70 (Hair et al., 2021). Composite Reliability, as an alternative reliability measure, is based on the outer loading values, and the accepted minimum value is 0.7 (Hair et al., 2021). Convergent validity, indicating the extent to which indicators positively correlate within the same construct, is measured using Average Variance Extracted (AVE) with a recommended minimum of 0.50 (Hair et al. 2021). Discriminant validity demonstrates differences between constructs and is measured by the Fornell Lacker Criterion and HTMT. Discriminant validity is accepted if the square



root of AVE for each construct is greater than the correlation value between different constructs. Additionally, an HTMT value below 0.90 indicates accepted discriminant validity evaluation (Hair et al. 2021).

The results of validity, reliability and discriminant validity at the dimension level shown in Table 5, Table 6, and Table 7 resulted in the elimination of 4 variables that did not meet the criteria. The four indicators are KNM1, INOO1, INOP1, and INOP2. Meanwhile, the results of validity, reliability and discriminant validity at the latent variable level have met all the criteria.

Table 5. Validity and Reliability Measurement Model

Latent Variable (second order)	Dimension (First Order)	Indicator	Outer Loading	Cronbach's Alpha	CR	AVE
Total Quality Management (Cronbach's Alpha: 0.978; CR: 0.959 AVE: 0.744)	Leadership	-	0.816			
		LDS1	0.880	0.929	0.947	0.780
		LDS2	0.900			
		LDS3	0.905			
		LDS4	0.908			
		LDS5	0.820			
	People	-	0.881			
		HRD1	0.839	0.886	0.916	0.686
		HRD2	0.837			
		HRD3	0.791			
		HRD4	0.828			
		HRD5	0.847			
	Policy and Strategy	-	0.843			
		PST1	0.863	0.938	0.953	0.801
		PST2	0.899			
		PST3	0.919			
		PST4	0.898			
		PST5	0.894			
	Partnership and Resources	-	0.841			
		PTR1	0.843	0.884	0.920	0.741
		PTR2	0.852			
		PTR3	0.872			
		PTR4	0.876			
Process	-	0.911				
	PRS1	0.875	0.926	0.944	0.773	
	PRS2	0.883				
	PRS3	0.908				
	PRS4	0.881				
	PRS5	0.849				
Knowledge Management	-	0.847				
	KNM2	0.839	0.912	0.938	0.791	
	KNM3	0.857				
	KNM4	0.869				
	KNM5	0.864				
	KNM6	0.864				
Customer Focus	-	0.845				
	CST1	0.857	0.911	0.933	0.737	
	CST2	0.890				
	CST3	0.900				
	CST4	0.909				
Culture	-	0.912				

Latent Variable (second order)	Dimension (First Order)	Indicator	Outer Loading	Cronbach's Alpha	CR	AVE
		CLT1	0.834	0.921	0.939	0.719
		CLT2	0.796			
		CLT3	0.869			
		CLT4	0.836			
		CLT5	0.890			
		CLT6	0.859			
Service Innovation (Cronbach's Alpha: 0.930; CR: 0.941 AVE: 0.889)	Organization	-	0.962	0.905	0.940	0.840
		INOO2	0.913			
		INOO3	0.917			
		INOO4	0.920			
	Product and Process	-	0.923	0.905	0.940	0.920
		INOP3	0.959			
		INOP4	0.959			
Risk Management	-	RM1	0.891	0.935	0.954	0.837
		RM2	0.913			
		RM3	0.939			
		RM4	0.916			
Pulic Sector Organizational Performance	-	PSOP	0.827	0.925	0.938	0.628
		PSOP	0.809			
		PSOP	0.741			
		PSOP	0.699			
		PSOP	0.824			
		PSOP	0.814			
		PSOP	0.840			
		PSOP	0.841			
		PSOP	0.723			

Table 6. Discriminant validity measurement model – first order

Table 7. Discriminant validity measurement model – second order

	CLT	CST	INOO	INOP	PST	LDS	PTR	KNM	PRS	HRD
CLT	0.848									
CST	0.738	0.889								
INOO	0.716	0.686	0.916							
INOP	0.615	0.627	0.785	0.959						
PST	0.725	0.683	0.602	0.557	0.895					
LDS	0.729	0.658	0.658	0.574	0.689	0.883				
PTR	0.737	0.702	0.703	0.621	0.628	0.573	0.861			
KNM	0.743	0.643	0.705	0.618	0.604	0.571	0.802	0.859		
PRS	0.813	0.766	0.678	0.612	0.743	0.679	0.734	0.744	0.879	
HRD	0.752	0.679	0.686	0.589	0.711	0.703	0.697	0.767	0.779	0.828

	INO	PSOP	TQM	RM
INO	0.943			
PSOP	0.703	0.792		
TQM	0.791	0.791	0.863	
RM	0.686	0.717	0.807	0.915

## 5.2 Structural Model Evaluation

Structural Model evaluation is in relation with hypothesis test between variables. For evaluation of Structural Model, first it needs to evaluate collinearity between variable and Inner VF (Variance Inflated Factor), next coefficient hypothesis path while if p-value test less that 0.05 it is significant and test of mediating variable, and the last, evaluate influence of variable in structural level with effect size f square (Hair et al., 2021).

In multicollinear can be known that if Inner VF value less than 5 show that there are no multicollinear variable. Table 7 show Inner VIF result from PLS model is less that 5, therefore multicollinear between variable have low value or can be ignored. This result indicates that the resulting PLS model parameter estimates are acceptable/unbiased, and

the estimation result have reliable parameters. The F square explains the influence of variables at the structural level, where the interpretation of F square values indicates low influence (F square = 0.02), moderate influence (F square = 0.15), and high influence (F square = 0.35), according to Hair et al. (2021). Table 8 also illustrates that the impact of TQM on Service Innovation and Risk Management is high, the impact of TQM on Public Service Organizational Performance is moderate, and the impact of Service Innovation and Risk Management on Public Service Organizational Performance is low.

Table 8. Inner VF and F Square

Variables	Inner VF			F Square		
	INO	RM	PSOP	INO	RM	PSOP
<b>TQM</b>	1.000	1.000	4.124	1.668	1.868	0.164
<b>INO</b>			2.715			0.036
<b>RM</b>			2.919			0.040

Hence, the hypothesis test can be conducted and the result is shown in Table 9

Table 9. Hypothesis test

Hypothesis		Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values	Remark
H1	TQM → POSP	0.484	0.485	0.079	6.094	0.000	Significant
H2	TQM → INO	0.791	0.793	0.033	23.920	0.000	Significant
H3	INO → POSP	0.182	0.182	0.062	2.938	0.003	Significant
H4	TQM → RM	0.807	0.809	0.025	31.653	0.000	Significant
H5	RM → POSP	0.202	0.201	0.061	3.312	0.001	Significant
H6	TQM → INO → POSP	0.144	0.145	0.050	2.867	0.004	Significant
H7	TQM → RM → POSP	0.163	0.163	0.049	3.325	0.001	Significant

Based on the hypothesis test in Table 6, it is shows that:

1. H1: There is significant influence between TQM and Performance of Public Sector Organization with path coefficient of 0.484 and t statistic 6.094 > 1,96 or p-value 0.000 < 0,05. Every change of TQM will improve Performance of Public Sector Organization.
2. H2: There is significant influence between TQM and Service Innovation with path coefficient of 0.791 and t statistic 23.920 > 1,96 or p-value 0.000 < 0,05. Every positive change in TQM will improve Service Innovation.
3. H3: There is significant influence between Service Innovation and Performance of Public Sector Organization with path coefficient of 0.182 and t statistic 2.938 > 1,96 or p-value 0.003 < 0,05. Every change in Service Innovation will improve Performance of Public Sector Organization.
4. H4: There is significant influence between TQM and risk management with path coefficient of 0.807 and t statistic 31.653 > 1,96 or p-value 0.000 < 0,05. Every change in TQM will influence in improving Risk Management.
5. H5: There is significant influence between Risk Management with Performance of Public Sector Organization with path coefficient of 0.202 and t statistic 3.312 > 1,96 or p-value 0.001 < 0,05. Every change in Risk Management will influence in improving Performance of Public Sector Organization.
6. H6: There is significant influence of mediating of Service Innovation to indirect influence between TQM and Performance of Public Sector Organization with path coefficient mediation of 0.144 and t statistic 2.867 > 1,96 or p-value 0.004 < 0,05. This result show that Service Innovation have important role as mediating variable. Because TQM significantly influence Performance of Public Sector Organization (H1), therefore the role of Service Innovation is partial mediation.
7. H7: There is significant influence mediating of mediating of Risk Management to indirect influence between TQM and Performance of Public Sector Organization with coefficient mediation of 0.163 and t statistic 3.325 > 1,96 or p-value 0.001 < 0,05. This result show that Risk Management have important role as mediating variable.

Because TQM significantly influence Performance of Public Sector Organization (H1), therefore the role of Risk Management is partial mediation.

To validate the structural model in PLS SEM, several measures that can indicate model acceptance include R square, Q square, SRMR, PLS predict (Hair et al. 2019), and Goodness of Fit Index (Henseler & Sarstedt, 2013). The R square statistical measure depicts the extent of variation in the endogenous variable explained by other exogenous/endogenous variables in the model. According to Chin (1998), the qualitative interpretation values for R square are 0.19 (low influence), 0.33 (moderate influence), and 0.66 (high influence). Q square represents the accuracy of predictions, indicating how well each change in exogenous/endogenous variables can predict the endogenous variable. This measure serves as a form of validation in PLS to indicate the predictive relevance of the model. Values above 0 indicate that the model has predictive relevance, but Hair et al. (2019) qualitatively interpret Q square values as 0 (low influence), 0.25 (moderate influence), and 0.50 (high influence). SRMR stands for Standardized Root Mean Square Residual. In Yamin (2022), this value is a measure of model fit, representing the difference between the correlation matrix of the data and the estimated model correlation matrix. According to Hair et al. (2021), an SRMR value below 0.08 indicates a good model fit. The Goodness of Fit Index (GoF Index) is an overall evaluation of the model, encompassing both measurement and structural models. This index is calculated by multiplying the geometric mean of communality with the mean R square. According to Wetzels et al. (2009) in Yamin (2022), the interpretation values for the GoF index are 0.1 (low GoF), 0.25 (medium GoF), and 0.36 (high GoF).

Table 10. - R Square, Q Square, SRMR, and GoF Index

Variabel	R Square	Q square	SRMR	GoF Index
INO	0.625	0.484	0.074	0.684
RM	0.651	0.542		
PSOP	0.655	0.399		

The results of statistical tests for R Square, Q Square, SRMR, and GoF Index are presented in Table 10. The magnitude of the influence of Total Quality Management (TQM) on service innovation is 62.5% (moderate to high influence). The impact of TQM on risk management is 65.1% (moderate to high influence). The combined influence of TQM, service innovation, and risk management on the performance of the public sector organization is 65.5% (moderate to high influence). Q square values for service innovation, risk management, and the performance of the public sector organization above 0 indicate that the constructed model has predictive relevance. The Q square values for service innovation (0.484 > 0.25 - moderate predictive accuracy), risk management (0.542 > 0.50 - high predictive accuracy), and the performance of the public sector organization (0.399 > 0.25 - moderate predictive accuracy). The SRMR model value is 0.074, indicating that the model has a good fit. Empirical data can explain the relationships between variables in the model. The GoF model value is 0.684, falling into the high GoF category. This means that empirical data can explain both the measurement model and the structural model with a high level of fit. The validated structural model is shown in Figure 2.

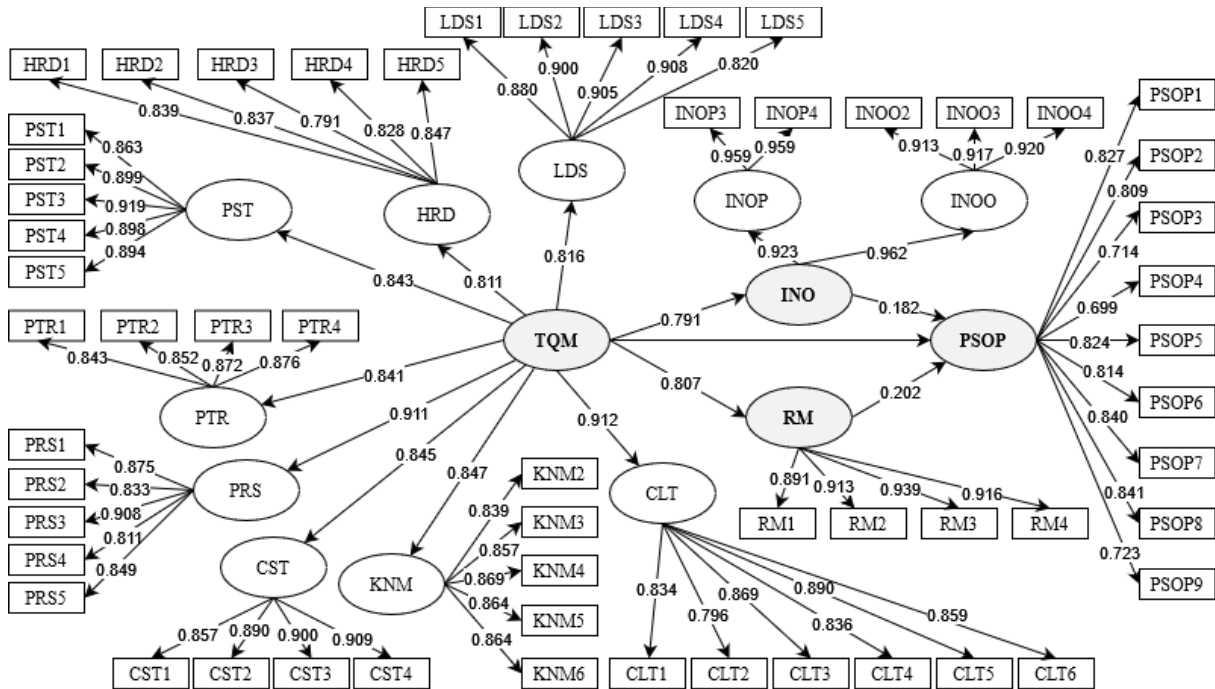


Figure 2. Structural Model

### 5.3 Discussion

Form the hypothesis result, TQM direct (H1) or indirect (H6-H7) implementation can improve Performance of Public Sector Organization. If the organization is only focusing on implementation of TQM, they need to focus on cultural (0.912), processes (0.911) and human resource (0.881) dimensions. Because Risk Management give more influence (0.163) that Service Innovation, therefore organization can start implementing Risk Management before implementing Service Innovation.

The research findings confirm previous studies on the: Association of TQM with organizational performance in both the public and private sectors conducted by Ali AlShehail et al. (2022), Al-Dhaafri & Alosani (2021), Sharma & Modgil (2020); Hummour et al. (2018); and Mosadeghrad (2014); relationship between TQM and Service Innovation in the public sector conducted by Ali AlShehail et al. (2022), Khan & Naem (2018), Zehir et al., (2012), and Zeng et al., 2015); connection of TQM with risk management in the public sector by Al-Geelawee & Mohammed (2016), and in the private sector by El Khatib et al. (2020); linkage of Service Innovation with organizational performance in the public sector by Ali AlShehail et al. (2022), and in the private sector by Aas & Pedersen (2011); correlation of Risk Management with organizational performance in both private and public sectors conducted by Durst et al. (2019) and Brătianu et al. (2020); interconnection of TQM, Service Innovation, and Organizational Performance in both public and private sectors by Ali AlShehail et al. (2022), Hussain et al., 2020, Khan & Naem (2018); association of TQM, Risk Management, and Organizational Performance in the small and medium-sized enterprise industry conducted by Lepistö et al. (2022).

And the structural model provides practical implications that public sector organizations should internalize TQM values within the organization, emphasizing stability; prioritize efficiency, control, and operational smoothness; focus on process improvement through continuous enhancements via self-inspection and automation; systematically monitor corrective actions related to risks; concentrate on organizational performance indicators, particularly the behavioral aspects of implementers, and handle complaints, suggestions, and feedback.

### 6. Conclusion

This Study is focused to investigate the relationship between TQM, Service Innovation, Risk Management and Public Sector Organizational Performance. The study shows that TQM, Service Innovation, Risk Management have direct significant influence on Public Sector Organizational Performance. The role of Service Innovation and Risk Management between TQM and Performance of Public Sector Organization is partial mediation, this meaning that

TQM implementation can be improved by implementing Service Innovation and Risk Management to enhance Performance of Public Sector Organization. Therefore, to improve the performance of Public Sector Organizations remains effectively by improving TQM, either directly or indirectly. The organization can focus on cultural, processes and human resources dimension because is the most important in implementing TQM. Next, organization can emphasize on leadership to improve TQM implementation. Further research can focus on other sectors in other location and sector such as manufacturing or services. It is also considered to research on the sustainable performance of the public sector as environmental issues are emerging.

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