



A study on the relationship among Servant Leadership, Authentic Leadership, Perceived Organizational Support(POS), and Agile Culture using PLS-SEM: Mediating Effect of POS

Tae-Wan Kim, *Doctoral Student, Dept. Of Knowledge Service & Consulting, Hansung University, Seoul, Korea,*
kim727800@hanmail.net

***Yen-Yoo You**, *Professor, Division of Smart Management Engineering, Hansung University, Seoul, Korea,*
threey0818@hansung.ac.kr

Jung-Wan Hong, *Professor, Division of Smart Management Engineering, Hansung University, Seoul, Korea,*
jwhong@hansung.ac.kr

*Corresponding Author

Abstract. Our study intended to review the characteristics of Agile Culture, which has attracted significant attention as an organizational culture suitable to deal with the recent changes in the management environment of enterprises and to reveal the role and interrelationships of leaderships, Agile Culture, and Perceived Organizational Support (POS).

First, through previous studies, leaderships that influence Agile Culture were viewed as Servant Leadership and Authentic Leadership, and POS as an organizational characteristic that mediates the relationship between these two leaderships and Agile Culture. In addition, the sub-dimensions of Agile Culture were recognized as Empowerment, Continuous Learning, and Collective Intelligence. Based on these findings, a research model was developed to analyze the effect relationship among these variables. Our study was conducted mainly on the National Agricultural Cooperative Federation and its affiliated organizations in Korea and the SmartPLS 3.3.2 was used for statistical analysis of collected data.

Both Servant Leadership and Authentic Leadership had positive effect on POS and POS had statistically significant effect on Empowerment, Collective Intelligence and Continuous Learning, all sub-dimensions of Agile Culture. The mediating effect of POS in the relationship between leaderships and Agile Culture was tested and POS mediated the positive effect of Servant Leadership and Authentic Leadership on two of the sub-dimensions of Agile Culture: Collective Intelligence and Empowerment.

The samples of this study were restricted to specific organization, limiting the generalization to all industries. The future studies should include various industries, and the scope of research needs to be expanded to additional factors affecting Agile Culture.

Keywords: Agile Culture, Empowerment, Continuous Learning, Collective Intelligence, Perceived Organizational Support, Servant Leadership, Authentic Leadership.

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INTRODUCTION

The recent change in technology, market, and customer characterized by the Fourth Industrial Revolution and digital transformation is faster than ever before. In addition, the phenomenon that called by Nassim Nicholas Taleb, an American professional investor and business scholar, as 'The Black Swan', that is something unlikely to happen, occurs repeatedly and frequently, including the international financial shock arising from the U.S. subprime mortgage crisis in 2008 or the current global crisis caused by the COVID-19 pandemic. Many managers were already well aware that old management methods are not suitable to guarantee their company's survival in such a rapidly changing, uncertain and unpredictable business environment, and this shift in awareness made the agile enterprise or agile methodology to attract attention. The Deloitte, a global consulting company, conducted a questionnaire survey of 10,000 business leaders from 140 countries in 2017 and 94% of the respondents referred agility and collaboration as the most important factors for success of organization [1]. Many companies, however, failed in transition to agile organization despite the existing methodologies for introducing agile management have been available. This is because it is often overlooked that the 'Agile' is ultimately a culture and the transition to agile management means the transition in the organizational culture.

Furthermore, although organizations are aware of the importance of agile culture, there has been other problem that the study on this area has been very limited. Under this context, the purpose of this study was, after confirming the common features of the Agile Culture as Continuous Learning, Collective Intelligence and Empowerment through previous studies, to provide fundamental data to study on agile culture focusing on human resource by investigating the impact of leaderships and POS on the Agile Culture.

1. Theoretical background

1.1. Concepts and theories of leadership

The leadership is, in the social science field, regarded as a core concept influencing organizational behavior and structure and is being addressed more than any other subject in behavioral science. The leadership is recognized as important concept in the social science field because it is linked to the achievements of the whole organization as well as to the formation of individual and group behaviors and is an important factor, in the rapidly changing modern society, for promoting the change of the organization that hesitates to change [2]. Although most scholars agree that leadership has effect on organizational members, they define and insist on different concepts according to social phenomena and research viewpoints [3]. This is why the leadership, despite the extensive studies in the field of social science, has not determined the conclusive definition and has not been established as a common theory with the addition of various views. The definitions of leadership provided by influential scholars are as follows: Fleishman & Hunt (1973) defined leadership as an attempt, through a communication process, to exert influence others to make them to pursue goals [4]. Yukl (1994) explained that leadership is a process of affecting the behavior of organizational member such as determining a goal or strategy, giving motivation to achieve one's goals, systematizing job activities, continuing cooperative relationships, developing self-confidence and skills, and securing external support and cooperation [5]. Kotter (1990) defined leadership as an ability to motivate, control, and influence others to achieve desirable goals [6]. In addition, Lee S. J (2017) argued that the exercise of leadership is not a one-off process, but a cycle process supported by continuous feedback, and that leaders continue to exert influence through various methods such as motivating organizational members [7]. The studies on leadership until now have been carried out in many different ways reflecting various methodology, approach, and the spirit of the time. The traditional leadership theories based on the innate characteristics of leaders and the process theory may be classified generally into trait theory, behavior theory, and situational theory. The trait theory that was adopted from the late 1930s to the 1950s considered that the leadership ability is an innate one and the behavior theory that was popular from the 1950s to the late 1960s attempted to find out the behavioral characteristics of the leaders shown to their subordinates. The situational theory that was influential from the late 1960s to the 1980s, from the perspective that everyone has talent to be a leader, focused on the various situations faced by the leaders rather than the leaders themselves. Many researchers, since the 1980s, have attempted to be closer to the essence of leadership by identifying the actual influence between leader and subordinate, beyond the traditional leadership, and in this context, various types of leadership such as transformational leadership, transactional leadership, etc. have been suggested and studied until now as well as servant leadership and authentic leadership. This study focused on servant leadership and authentic leadership that value the growth and communication of organizational members based on democratic values, as a leadership types that affect agile culture that responds flexibly and quickly to changes in the market or industry environment.

1.2. Servant Leadership

The servant leadership was first introduced in Greenleaf's book, "The servant as a leader" and Greenleaf (1970) described the servant leadership as a dedication to satisfy the needs of customers and members focusing on serving others [8]. Since the servant leaders believe that the most important resource for achieving an organization's goal is an organizational member, they perceive support for the growth and success of the organizational members as their role and recognize the relationship between them and the subordinates as a horizontal one by considering themselves as a servant. The servant leaders also provide their subordinates with a sense of trust and an environment in which subordinates seek change and growth, and strive to form a mutual consensus with subordinates. The organizations controlled by servant leadership, therefore, form consensus among members through advice and dialogue rather than instructions, and based on this, achieve the organization's goals. The servant leadership, in addition, promotes empowerment that maximizes the ability and potential of members by assigning the authority to make decisions on their own to specific individuals or groups [9], foster the atmosphere for learning to acquire new knowledge and increase the level of the learning organization within the group [10], and promotes participatory decision-making in which organizational members give their opinions and exert influence in the decision-making process [11].

2.3. Authentic Leadership

The authentic leadership is a process of reinforcing positive self-development by leaders and subordinates through self-regulatory and self-awareness and is defined as the behavioral style of the leader based on self-awareness, internalization of moral views, balanced information and relationship transparency, which improve the positive psychological abilities and ethical atmosphere of organizational members [12]. The authentic leadership makes decisions based on moral values, delivers the vision and its meaning to members through transparent communication, improves insufficient competencies and behaviors of organizational members, and triggers positive behavioral pattern by wakening the inherent positive minds of both leaders and subordinates. The authentic leadership, in addition, improves the psychological empowerment of members by stimulating members' positive mind and attitude [13], provides an atmosphere that encourages individual and organizational learning through transparent relationships and communication with members [14], and facilitates participatory decision-making by members by collecting, based on the trust of members, various viewpoints and opinions regardless of their position [15]. It was found, on the other hand, that the leadership characterized by coordination, integration and support positively affect the expression of collective intelligence [16].

2.4. Perceived Organizational Support (POS)

The POS is the belief of individual members about the degree to which an organization is interested in their own happiness, and is the perception of organization members about the level the organization put to their role or performance. POS is rooted in social exchange theory and argues that, when the satisfaction of members with their organization or leader, they also have the intention to help the organization and that, by focusing on tasks through the demonstration of their own capabilities, they not only improve the performance but also reduce the turnover intention toward other organization [17]. POS has been addressed frequently as a control or mediating variable. The antecedent variables include support by the leader, good relationship with the leader, trust and consideration for the organization and management. Servant leadership acts as a factor to raise POS by providing, beyond a formal employment relationship, extended support to organizational members based on the trust relationship with them [18]. The authentic leadership also changes the attitudes and behaviors of organizational members, such as organizational citizenship behavior, based on the trust relationship, and it was found that POS acts as a mediating factor in this process [19]. One of the variables to which POS influences is empowerment, which enables organizational members to perform various roles by inducing organizational citizenship behavior [20]. In addition, given that the action of collective intelligence requires reinforcement of commitment to the group through non-monetary compensation such as praise and recognition [21], it may be inferred that the POS influences this commitment. On the other hand, the continuous learning is essential to improve the ability of an organization to respond to rapidly changing environments, and POS has an important influence on raising the level of establishment of a learning organization that provides a field for organizational members [22].

2.5. Agile Culture

The 'Agile' concept appeared in the software development methodology in the 2000s. 17 distinguished software developers such as Kent Beck adopted a new software development method different from the traditional waterfall model at Snowbird Ski Resort in Utah, U.S. in 2001, and published it through 'The Agile Manifesto'. The Agile method they proposed, unlike the traditional management methods, was to quickly accept various changes through rapid feedback and continuous correction without detailed plan and the importance was given to management method based on collaboration, tacit knowledge, flexible and cooperative organizational structure, leadership as an assistant, and reward system for teams rather than individuals. The origin of the word "Agile" in the field of social science, however, goes back to older date. The 'adaptivity' concept in the 1950s and 'organizational flexibility' in the 1980s instead of 'Agility' were used as the ability to cope with change and uncertainty, and the 'Agility' concept was introduced for the first time in the 'Strategies for Manufacturing Enterprises in 21th Century' published by the Institute of Iacocca at Leigh University in the United States as a concept to respond to a dynamic and changing environment [1]. Agile methodology that developed in the IT industry is expanding recently to various industrial fields, and has been accepted by many companies. The Agile organization refers to one that emphasizes dynamics and speed in organizational operation, overcomes the walls of departments, and forms small teams to perform tasks [1]. The definition of agile culture has not yet been established, however, is being conceptualized by the study of several scholars on the characteristics of agile organization. Harraf et al (2005) argued that the agile culture is an attribute of a horizontal and flexible organization, and includes empowerment, active participation of organizational members, cooperation, and agreement [23]. In addition, Jung J. S (2019) reported that the important cultural factors in agile organizations include immersive talent management, innovation culture, autonomous

organizational structure, and collective intelligence [24].

2. Experimental setup

3.1. Research Model

A research model was designed as shown in Fig. 1 to analyze the structural relationship between the leaderships, POS, and Agile Culture discussed above. For the leadership, the servant leadership and authentic leadership that are based on human relations, trust, and communication with members were set as exogenous variables. The sub-dimensions of Agile Culture such as Empowerment, Collective Intelligence, and Continuous Learning, which are found commonly in several previous studies, were set as endogenous variables.

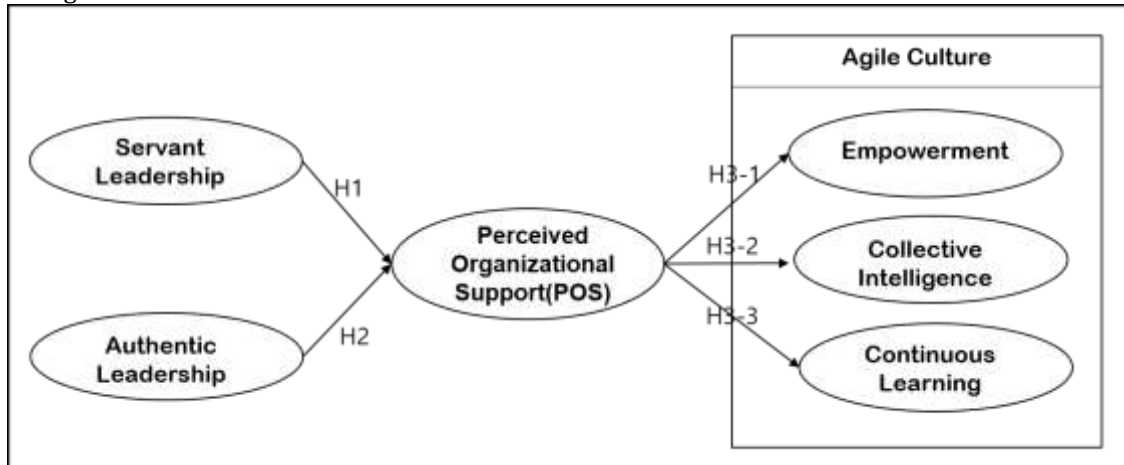


Figure 1. Research Model

3.2. Research Hypotheses

As discussed in Theoretical Background, following hypotheses were established based on Kim Y. H.(2010)[9], Kim J. H. & Choi E. S.(2013)[10], Yu S. S.(2017)[11], Kim Y. S. & Shin J. G.(2018)[13], Sun T. M. & Choi E. S.(2016)[14], Choi S. H. & An Na.(2016)[15], and Tak J. W & Oh H. J.(2018)[16] on the direct effect of Servant and Authentic leaderships on Agile Culture; Zhou & Miao(2014)[18] and Kwon Y.S & Lim JK(2015)[19] reporting the positive effect of Servant and Authentic leaderships on POS; and Kang E. G. & Lee S. K.(2017)[20], Lee A. K.(2011)[21], and Jeong J. J. & Lee J. G.(2017)[22] reporting the impact of POS on Empowerment, Collective intelligence, Continuous learning, which are sub-dimensions of Agile Culture.

H1: Servant Leadership will have a positive effect on POS.

H2: Authentic Leadership will have a positive effect on POS.

H3: POS will have a positive effect on Agile Culture.

H3-1: POS will have a positive effect on Empowerment.

H3-2: POS will have a positive effect on Collective Intelligence.

H3-3: POS will have a positive effect on Continuous Learning.

H4: POS will mediate the positive effect of Servant Leadership on Agile Culture.

H4-1: POS will mediate the positive effect of Servant Leadership on Empowerment.

H4-2: POS will mediate the positive effect of Servant Leadership on Collective Intelligence.

H4-3: POS will mediate the positive effect of Servant Leadership on Continuous Learning.

H5: POS will mediate the positive effect of Authentic Leadership on Agile Culture.

H5-1: POS will mediate the positive effect of Authentic Leadership on Empowerment.

H5-2: POS will mediate the positive effect of Authentic Leadership on Collective Intelligence.

H5-3: POS will mediate the positive effect of Authentic Leadership on Continuous Learning.

3.3. Population and Sample Selection

The questionnaire survey was administered to employees working in the Planning Department and Management Department of the National Agricultural Cooperatives Federation (NACF) and Nonghyup Agribusiness Group in Korea. NACF in Korea is a federation of Agricultural cooperatives, the largest producer organization in Korea, and has Nonghyup Financial Group and Nonghyup Agribusiness Group under its subsidiaries. Nonghyup Financial Group has eight subsidiaries related to businesses including bank, life insurance, property & casualty insurance, and investment & securities, and Nonghyup Agribusiness Group has 17 subsidiaries related to businesses such as distribution, manufacturing, food, logistics, and trade. NACF and Nonghyup Agribusiness Group were selected as the subjects of this study because these organizations received business strategy consulting from the BCG-KPMG consortium in 2018, have sought management innovation until recent times, and in particular significant efforts have

been made to introduce and establish the agile organization and culture. The employees of Planning Department and Management Department were selected for questionnaire survey because this group has high understanding of the agile method and culture than other groups since the organizations are in early stage of adopting them. We conducted the survey for about two months, January ~ February, in 2020. 200 questionnaires were distributed and 171 ones were collected. The questionnaires with missing values were excluded and the 160 valid samples were used in analysis. The results of demographic analysis of valid samples using the SPSS statistics package are as follows: Male and female occupied 77.1 and 22.9%, respectively. Those in their 20s, 30s, 40s, and 50s or older were 7.0, 45.2, 38.9, and 8.9%, respectively. As for the educational background, high school graduation or less, college graduation, and graduates or higher were 1.9, 82.2, and 15.9%, respectively. As for the positions, assistant manager or lower, general manager, and, team manager or higher were 36.9, 42.7, and 20.4%, respectively. As for the service years, shorter than five years, five-ten years, ten-fifteen years, fifteen-twenty years, and longer than twenty years were 27.4, 20.4, 19.1, 15.9, and 17.2%, respectively.

3.4. Measurement and Operational Definition of Variables

The questionnaire items for servant leadership was developed focusing on the characteristics of servant leadership such as altruistic calling and emotional healing, referring to the questionnaire developed by Yi S. Y (2109) and Yu J. G (2019) based on the concept defined by Spears (1995), Yukl (2009), and Barbuto & Wheeler (2006). The questionnaire items for authentic leadership were developed focusing on self-awareness, internalization of moral views, balanced information, referring to the items developed by Park B. M (2019) based on the scale developed by Neider & Schriesheim (2011). The questionnaire items for POS were developed by referring also to items by Park B. M (2019) who reported that the measurement tool was developed by referring to several previous studies based on Eisenberger et al. (1986). The questionnaire items for Empowerment, one of the sub-dimensions of Agile Culture, were developed by referring to the items developed by Kim H. G (2019) and Kim YG (2019), abbreviated form of one from Bolton & Brookings (1998). The questionnaire items for Collective Intelligence were developed based focusing on participation, openness, and cooperation, referring to items developed by Cho M. H (2018), which were based on the Mark (2008) and Leadbeater (2008). Lastly, the questionnaire items for Continuous Learning were developed focusing on participation in educational program and job experience by referring to items developed by Choi Y. A (2014) and Jeon S.I (2015). All questions were applied with Likert 5-point scale, and the detail operational definitions of constructs are shown in Table 1.

Table1. Operational Definition of Constructs

Constructs	Operational Definition	Ref.
Servant Leadership	A leadership that makes leader to prioritize helping subordinates and do their best to help subordinates, and makes subordinates to think that leader is one whom they consult with and encourage them when they are in trouble.	Yi S.Y. (2019), Yu J.G. (2019)
Authentic Leadership	A leadership in which the leaders are well aware the effect of their behaviors on others, decisions are made only based on one's core values and beliefs, the pressure to act against one's own beliefs are rejected actively, and one's intention is expressed clearly.	Park B.M. (2019)
Perceived Organizational Support(POS)	The employee's perception that the company appreciates one's achievements, takes care for one's growth and development while taking full consideration of one's goals and values, and cares for one and is proud of what one's achievement, and one can receive help from company in difficult situation.	Park B.M. (2019)
Empowerment	Assignment of responsibility to employees by the company to allow them to decide how they perform their jobs, to have independence and freedom in performing their tasks, and to have considerable influence and authority over the work processes of their departments.	Kim H.J. (2019), Kim Y.G (2019)
Collective Intelligence	A situation in which an opportunity to present one's professional insight actively to company is provided, a communication channels for job performance are activated, and work is performed smoothly through cooperation.	Cho M.H. (2018)

Continuous Learning	A situation in which employees use the training programs to learn new knowledge and skills in the support by company and participate in not only workshops and conferences, but also clubs and study groups held outside the organization to develop their careers and acquire new knowledge.	Choi Y. A (2014), Jeon S.I. (2015)
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3.5. Analysis Method: PLS-SEM

This study used SmartPLS 3.3.2 to empirically test the hypotheses through Partial Least Squares Structural Equation Modeling (PLS-SEM). The question of whether PLS-SEM or Covariance-Based SEM (CB-SEM) is more appropriate is still under debate though there are cases where PLS-SEM is relatively more suitable. PLS-SEM enables analysis when the number of samples is small, data does not follow the normal distribution, and both formative and reflective measures are included in the research model. The PLS-SEM has higher statistic power compared to CB-SEM, therefore, useful for exploratory research verifying theories that have not yet been established or is under development [25]. This study applied PLS-SEM because this study used 160 samples, a relatively small number, and deals with the topic of agile organizational culture, which has not yet been established as a concept due to short history of investigation.

3. Result discussions

4.1. Evaluation of Outer Model

PLS-SEM evaluation using SmartPLS consists of two stages: one is the outer model evaluation which is the process of checking the reliability and validity of the measurement tool and the other is the inner model evaluation which judges the suitability of the structural model. When the evaluation result for the structural model shows that the criteria are acceptable, the researcher is allowed to test the research hypotheses finally. To proceed with this procedure, the outer model evaluation test was performed first. Since the research model of this study is a reflective measurement model that contains only reflective latent variables, the convergent validity, internal consistency reliability, and discriminant validity were evaluated separately and the results are shown in Table 2.

Table2. Reflective measurement model evaluation result

variables	Measured variables	Convergent validity			Internal consistency reliability			Discriminant validity
		Outer loading relevance	Indicator reliability*	AVE	Cronbach α	rho_A	CR	HTMT
		≥0.70	≥0.50	≥0.50	0.60 ~ 0.90	≥0.70	0.60 ~ 0.90	**
Servant Leadership	SL1	.880	.774	.785	.911	.939	.936	valid
	SL2	.889	.790					
	SL3	.871	.759					
	SL4	.904	.817					
Authentic Leadership	AL1	.817	.667	.643	.819	.867	.877	valid
	AL2	.788	.621					
	AL3	.874	.764					
	AL4	.721	.520					
Perceived Organizational Support (POS)	POS1	.745	.555	.677	.903	.905	.926	valid
	POS2	.886	.785					
	POS3	.869	.755					
	POS4	.714	.510					
	POS5	.838	.702					
	POS6	.867	.752					
Empowerment	EMP1	.798	.637	.635	.855	.859	.896	valid
	EMP2	.854	.729					
	EMP3	.853	.728					
	EMP4	.721	.520					
	EMP5	.748	.560					
Collective Intelligence	CI1	.804	.646	.673	.756	.761	.860	valid
	CI2	.867	.752					

	CI3	.788	.621					
Continuous Learning	CL1	.884	.781	.743	.824	.846	.896	valid
	CL2	.926	.857					
	CL3	.768	.590					

*The Indicator reliability is calculated as the square of the outer loading relevance

**Confidence intervals do not contain 1

The convergent validity represents that there should be a high correlation between the result values measured by different measurement methods for the same latent variable, and outer loading relevance, indicator reliability, and AVE values are used. To provide specific results, the outer loading relevance values were all above the threshold of 0.7, the indicator reliability for individual measurement variables was also above the threshold of 0.5, and the AVE was above the threshold of 0.5, indicating that the convergent validity of the study variables and individual measurement variables was supported. In addition, The Cronbach α was above the threshold of 0.6, indicating desirable reliability. The rho_A is above 0.7 and CR is above 0.6, demonstrating the internal consistency reliability of the study variables. There was no value of 1 in the confidence level of HTMT, indicating that the discriminant validity is supported.

4.2. Evaluation of Inner Model

After completing the measurement model evaluation in PLS-SEM, the second step is to evaluate the structural model itself. The fitness between the structure of the study model and the empirical data is evaluated, and the appropriateness of the study model setting is tested. The evaluation of structural model in PLS-SEM requires the review of the multicollinearity, the coefficient R^2 of determination, the predictive relevance Q^2 , and the relative effect size f^2 of exogenous variables on endogenous variables. First, the inner VIP values examined to evaluate the multicollinearity between latent variables were in the range of 1.000-1.642, all of which were smaller than 5 showing no multicollinearity between latent variables. Next, R^2 and Q^2 were evaluated, and the results are shown in Table 3. For the R^2 , POS, Empowerment, Collective Intelligence, and Continuous Learning were shown to have explanatory power of 18.9, 23.6, 29.6, and 11.5%, respectively. Hair. et al. (2014) presented a guideline that classifies the explanatory power into substantial, moderate, and weak when the R^2 values are 0.75, 0.50, and 0.25, respectively [25]. However, the evaluation of model using only R^2 has limitation because the possibility of increasing the value of R^2 is likely to increase when the number or path of latent variables increases and the criteria for determining R^2 are different depending on the academic field. Given these considerations, this study adopted the criteria presented by Cohen (1998) [26] for the field of behavioral science (0.26: substantial, 0.13: moderate, 0.02: weak) proposed in the field of behavioral science and, according to it, R^2 s of all endogenous latent variables have appropriate explanatory power. Q^2 may be obtained by using blindfolding measurement in which the samples are re-used in SmartPLS and the values above zero may be regarded as indicating predictive relevance of the model. The Q^2 of all the endogenous latent variables used in the research were above zero as shown in Table 3, indicating that the predictive relevance is supported.

Table3. The evaluation result of coefficient of determination(R^2) and predictive relevance(Q^2)

endogenous latent variables	R^2	Q^2
POS	.189	.119
Empowerment	.236	.141
Collective Intelligence	.296	.194
Continuous Learning	.115	.081

Next, the relative effect size f^2 of exogenous latent variables on the R^2 of endogenous latent variables was examined and the results are shown in Table 4. The effect size is regarded as strong, moderate, and weak effect when the f^2 value is 0.35, 0.15, and 0.02, respectively. As shown in Table 4, the f^2 of POS that contributes to R^2 of Collective Intelligence was 0.420, indicating strongest contribution, and the f^2 of Authentic Leadership that contributes to R^2 of POS was 0.049, stronger than that of Servant Leadership ($f^2=0.039$), though both have relatively weak effect size.

Table4. The evaluation result of coefficient of effect size(f^2)

path	f^2	effect size
Servant Leadership → POS	.039	'weak'
Authentic Leadership → POS	.049	'weak'
POS → Empowerment	.309	'moderate'
POS → Collective Intelligence	.420	'strong'
POS → Continuous Learning	.130	'slightly smaller than moderate'

4.3. Hypotheses test

Based on the fact that the relevance of structural model was confirmed, the significance and relevance of path coefficient were evaluated through bootstrapping. The subsamples were set as 5,000 in bootstrapping and the results are shown in Fig.2 and Table 5. Since t values for path coefficient of all the hypotheses were higher than the threshold of 1.96 at significance level of 5%, the p values were less than 0.05, and there was no zero in confidence interval as shown in Table 5, the hypotheses H1, H2, H3-1, H3-2, and H3-3 were supported. Servant Leadership and Authentic Leadership had similar levels of effect size on POS and the greatest influence of POS on sub-dimensions of Agile Culture was found in that on Collective Intelligence and followed by those of Empowerment and Continuous Learning.

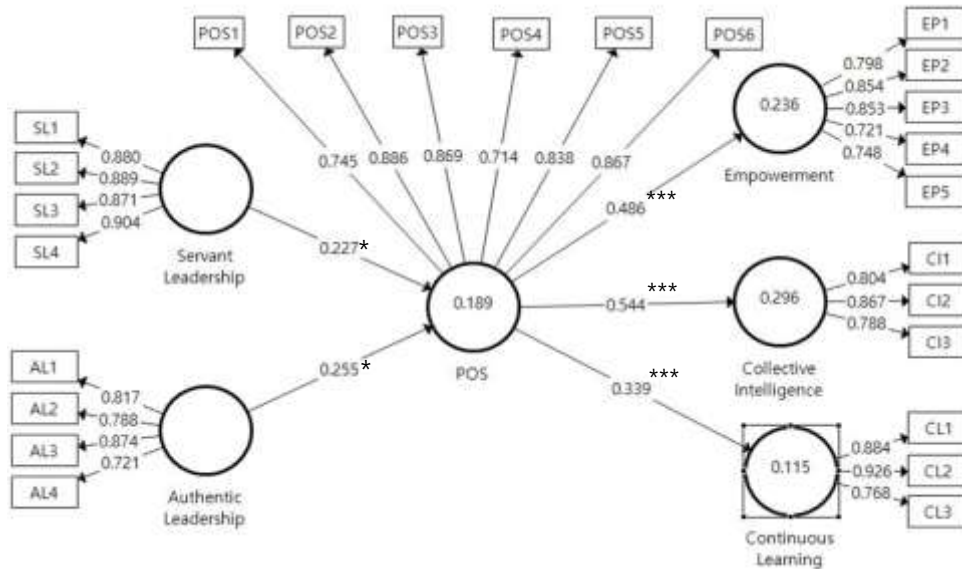
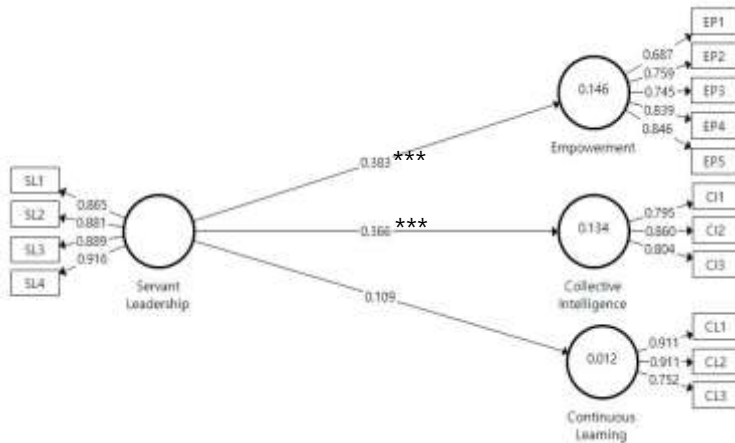


Figure 2. Results of PLS-SEM

Table 5. The evaluation result of significance and suitability of path coefficients

Path	Path coefficient	t value	p value	95% confidence interval	result	
<H1> Servant Leadership → POS	0.227	2.355	0.017	[0.049, 0.423]	supported	
<H2> Authentic Leadership → POS	0.255	2.399	0.016	[0.042, 0.463]	supported	
<H3>	<H3-1>POS → Empowerment	0.486	7.712	0.000	[0.364, 0.609]	supported
	<H3-2>POS → Collective Intelligence	0.544	9.299	0.000	[0.425, 0.655]	supported
	<H3-3>POS → Continuous Learning	0.339	4.558	0.000	[0.192, 0.483]	Supported

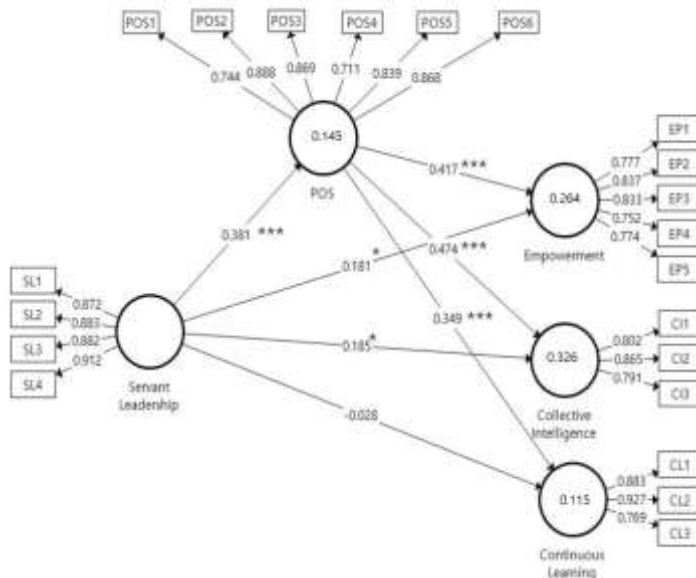
Next, the mediating effect of POS in the effect of Servant Leadership and Authentic Leadership on Agile Culture was tested. Hair et al (2014) proposed, to test mediating effect through PLS-SEM, an analysis consists of two stages where the model 'without mediating variable' are estimated and those 'with mediating variable' are tested to calculate indirect effect [25]. First, in the model 'without mediating variable' as shown in Fig. 3, it was confirmed that the effects of Servant Leadership on Empowerment (t=6.315, p=0.000) and Collective Intelligence (t=4.699, p=0.000) were significant, while that on Continuous Learning (t=1.012, p=0.311) was not significant. These results suggested that Servant Leadership → Continuous Learning cannot be the subject of a mediating effect test, and only the impact of Servant Leadership on Empowerment and Collective Intelligence can be the subject of the mediating effect test.



Notes: *p<0.05, **p<0.01, ***p<0.001

Figure 3. Model without mediating variable (1)

The significant effect of Servant Leadership on Continuous Learning also was not found in the model ‘with mediating variable’ in Fig. 4. The path coefficient of specific indirect effect and its significance were examined to investigate the mediating effect of POS and the detail results are shown in Table 6. It was found that the POS mediates the effect of Servant Leadership on Empowerment and Collective Intelligence. Although the path of Servant Leadership → POS → Continuous Learning was significant as shown in Table 6, the POS cannot be considered to have mediating effect in relationship between two variables since the direct effect of Servant Leadership on Continuous Learning was not significant as shown in Fig. 3.



Notes: *p<0.05, **p<0.01, ***p<0.001

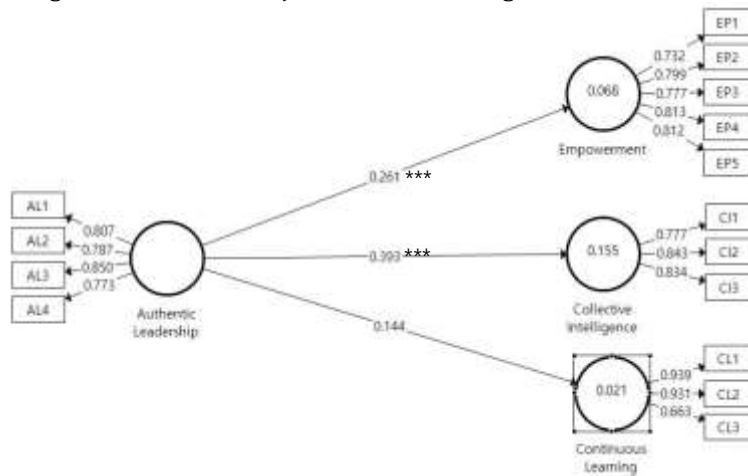
Figure 4. Model with mediating variable (1)

Table 6. The results of mediating effect hypotheses test 1

Path	Path coefficient	t value	p value	95% confidence interval	result	
<H4>	<H4-1> Servant Leadership → POS → Empowerment	0.159	3.938	0.000	[0.088, 0.249]	supported
	<H4-2> Servant Leadership → POS → Collective Intelligence	0.181	3.913	0.000	[0.103, 0.284]	supported
	<H4-3> Servant Leadership → POS → Continuous Learning	0.133	2.692	0.007	[0.053, 0.243]	-

In the model ‘without mediating variable’ as shown in Fig. 5, it was found that the effects of Authentic leadership on Empowerment (t=3.764, p=0.000) and Use of Collective Intelligence (t=5.201,

p=0.000) were significant, while that on Continuous Learning (t=1.445, p=0.149) was not significant. These results suggested that Authentic Leadership → Continuous Learning also cannot be the subject of a mediating effect test, and only the impact of Authentic Leadership on Empowerment and Use of Collective Intelligence can be the subject of the mediating effect test.



Notes: *p<0.05, **p<0.01, ***p<0.001

Figure 5. Model without mediating variable (2)

The significant effect of Authentic Leadership on Continuous Learning also was not found in the model 'with mediating variable' in Fig. 6. The path coefficient of specific indirect effect and its significance were examined to investigate the mediating effect of POS and the detail results are shown in Table 7. It was found that the POS mediates the effect of Authentic Leadership on Empowerment and Collective Intelligence. Meanwhile, the significance of relationship between Authentic Leadership and Empowerment disappeared with the addition of POS, a mediating variable, meaning that the POS completely mediates the relationship between two variables. Lastly, although the path of Authentic Leadership → POS → Continuous Learning was significant as shown in Table 7, the POS cannot be considered to have mediating effect in relationship between two variables since the direct effect of Authentic Leadership on Continuous Learning was not significant as shown in Fig. 5. This results, however, is inconsistent with the results of Kim J. H & Choi E. S (2013) [10] and Sun T. M & Choi E. S (2016) [14] that the Servant leadership and Authentic leadership are effective in raising the level of learning group within organization and improving the learning atmosphere perhaps because of sample characteristics and small sample size (n=160) of this study, justifying the need of further studies.

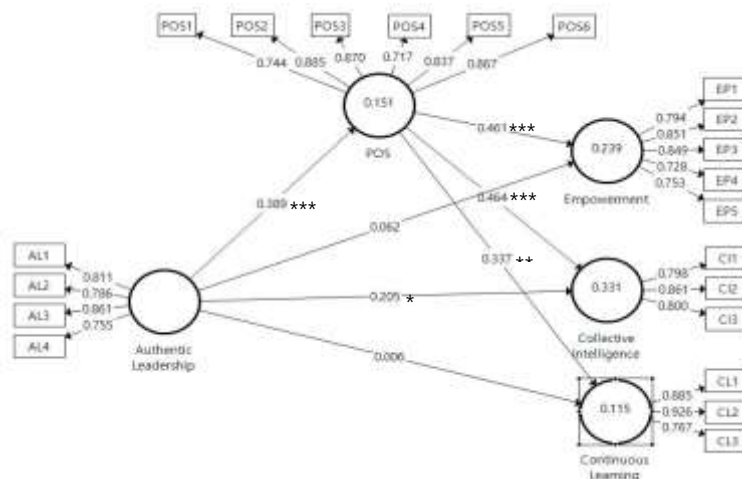


Figure 6. Model with mediating variable (2)

Table 7. The results of mediating effect hypotheses test 2

path	Path coefficient	t value	p value	95% confidence interval	result
<H5> <H5-1> Authentic Leadership → POS	0.179	3.817	0.000	[0.096, 0.280]	supported

	→ Empowerment					
<H5-2>	Authentic Leadership → POS → Collective Intelligence	0.180	4.189	0.000	[0.103, 0.272]	supported
<H5-3>	Authentic Leadership → POS → Continuous Learning	0.131	2.542	0.011	[0.046, 0.249]	-

4. Conclusions

5.1. Research Results and Implications

This study analyzed the effect of Servant Leadership that emphasizes the people such as support for growth of members, orientation towards horizontal culture, and communication and sympathy as important factor for achieving goal and Authentic Leadership adopts moral value and transparent communication as central principle on POS meaning the commitment to organizational members and Agile Culture that seeks rapid recognition of and response to change. The studies on Agile Culture have been conducted in relatively recent times. This study identified Collective Intelligence, Empowerment, and Continuous Learning as common features of agile organizations. The summarized conclusions of analysis are as follows: First, both Servant Leadership and Authentic Leadership were found to have a positive impact on POS. Second, POS had statistically significant effect on Collective Intelligence, Empowerment and Continuous Learning, all sub-dimensions of Agile Culture. Third, the mediating effect of POS in the relationship between leaderships and Agile Culture was tested and it was found that POS mediated the positive effect of Servant Leadership and Authentic Leadership on Collective Intelligence and Empowerment. POS, in particular, completely mediated the relationship between Authentic Leadership and Empowerment. It was concluded, however, that POS had no mediating effect in the effects of two kinds of leadership on Continuous Learning because, although the specific indirect effect between leaderships and Continuous Learning was statistically significant, the leaderships had no direct impact on Continuous Learning. These results, all together, suggested that the organization seeking to achieve a sustainable management in the current uncertain and rapidly changing business environment should consider the transfer of the organizational culture from the old authoritative and top-down one to a horizontal and flexible Agile one and recognize POS as an important variable that promotes such Agile culture. The organizations that seek the introduction and settlement of Agile culture should establish a formal or informal system and environment that make the employees to believe that they are recognized and supported by the organization. The leaders of organization should make efforts, if they want to instill such awareness into the organization firmly, to demonstrate the strength of Servant Leadership and Authentic Leadership, which are human resource centered and communication & value oriented horizontal ones. It should be noted that POS mediated fully the impact of Authentic Leadership on Empowerment, suggesting that the firm establishment of POS is important in inducing members to exert effectively the given responsibility after they are assigned fairly according to position or role.

5.2. Study Limitations and Future Directions

The subjects of this study were restricted to employees of NACF and Nonghyup Agribusiness Group in Korea, limiting the generalization of the results to all industries. The future studies should extend the research scope to include companies with more various sizes and industries. In addition, to present a comprehensive methodology to organizations that plan to introduce Agile Culture, further studies on various organizational and environmental characteristics that have an impact on Agile Culture should be conducted.

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