EFFECTIVE DRUG MAKING NEEDS BETTER LOCAL TEAM WISDOM: AN EMPIRICAL STUDY OG THE HERBAL CITY PHARMACEUTICAL OF SARABURI THAILAND

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ABSTRACT

While the mechanism of local team wisdom, which mainly refers to the ability of team members to make the right use of their information and knowledge mainly through their actions, ethical judgments, and decisions. Though, the main aim of this research paper is to evaluate the impact of team wisdom mechanisms on the innovation performance of pharmaceutical firms in Thailand. Based on the mechanisms and framework of firm wisdom and group wisdom, this research study also examines the mediating impact of team virtue and team intention on the relationship between local team wisdom and innovation performance. This research paper also aims to identify the innovation process of the pharmaceutical firm's team wisdom as a mechanism for how team individual's best to use the flow of their information through ethical virtues and emotions. By examining different pharmaceutical firms in Thailand this research study empirically indicate that the role of team wisdom mechanism is significant in improving the innovation performance of the sector. The findings of this research study also concluded that the impact of team virtue and team intention is so positive in improving the relationship between local team wisdom and innovation performance. There are several managerial and practical implications of this research.

Keywords: Team wisdom mechanism, team virtue, team intention, innovation performance, teamwork

Introduction

As firms are usually acquainted with dynamic business environment, they have shifted to the approach of 'teams' for coping with these challenges. Resultantly, they are able to achieve and maintain the desired goals. These teams make effective use of the relevant information and use their wisdom, intelligence, prudence, ethics and intuitive abilities to forge Innovation in their firms to boost their Innovation performance (Akgün, Keskin, & Kırçovalı, 2019). In order to achieve the economic and health benefits, many pharmaceutical firms are now investing in clinical research.

Table 1.1: Benefits from Clinical Research in Thailand

Benefits (economic and health terms)	Baht (billions)
Amount spent on Clinical trials	10.4
Contribution to GDP of Thailand	8.8
Projected benefits in health	10.5

Thailand is known as the 'medical hub' of Asia, as it stands second in the drug sector in South Asia. Much economic and health benefits have been achieved from research in the Pharma sector as this leads to innovation and overall progress in the country, as shown in table 1.1. However, we see that return from clinical research and innovation is gradually decreasing owing to the reason that effective steps need to be taken to improve the R& D so that IP of Pharma companies could be improved. For this purpose, it is important to establish teams that could have skills and capabilities to collaborate efficiently for increasing the IP.

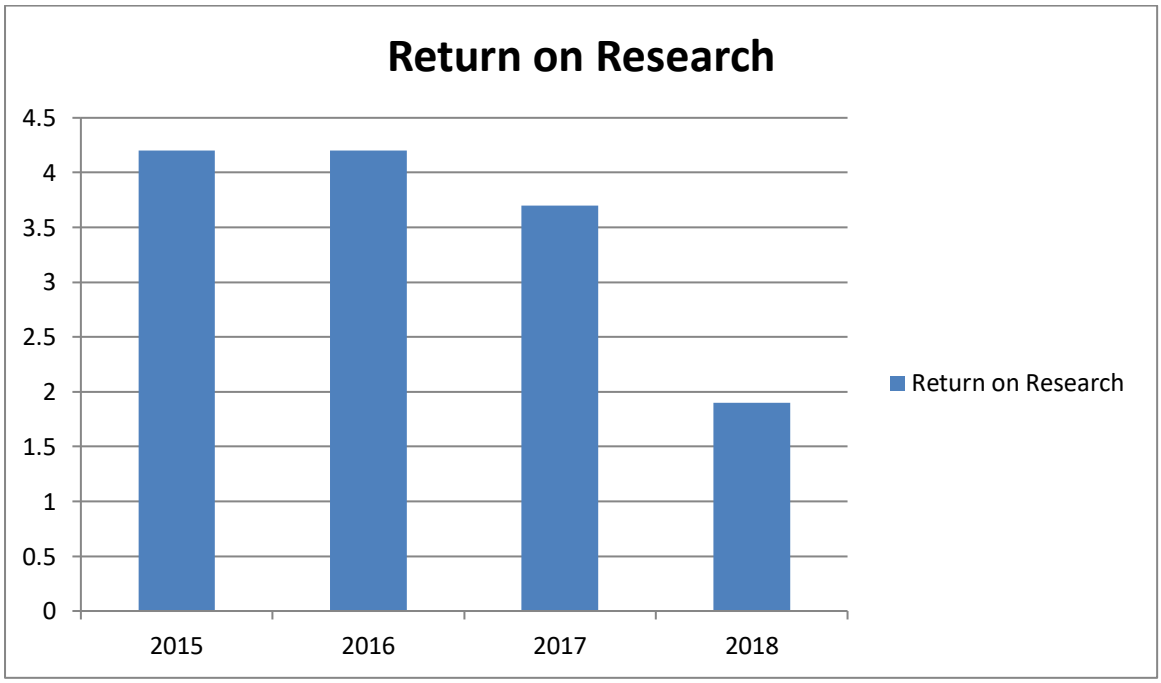

Figure 1.1: Return from Clinical Research (Deloite)

Many studies have focused on team wisdom, however the relationship between various wisdom practices is still fragmented (Akgün, 2020; Akgün et al., 2019). Also, a narrowing this concept for pharmaceutical firms from the perspective of Thailand is required, as they vary from culture to culture (Dayan & Elbanna, 2011). This study will address these research gaps. This paper's prime objective is to see how team wisdom can add value to innovative performance of the pharmaceutical firms in Thailand. Specifically, this study has the following research objectives:

- To determine the impact of TWM on IP
- To determine the mediating path of TP in the association of TWM and IP

- To determine the mediating path of TI in the association of TWM and IP
- To determine the mediating path of TV in the association of TWM and IP

Theoretically, this study has added contribution to the body of knowledge by investigating the role of Team prudence, intuitive and virtue as the potential mechanism in the role of TWM in achieving innovation performance. Practically, the results of this study will provide benefits to managers who can build teams and use their wisdom, prudence, virtue and intuition for superior IP.

Literature Review

2.1 Theoretical background

The study uses the "process philosophy theory' to establish how team wisdom can be utilized strategically to build mechanisms which can produce desired results (Styhre, 2002).

2.2 Impact of Team Wisdom Mechanics (TWM)

TWM is a process according to which the members of a specific team use the knowledge for making decisions. In other words, TWM is a set of practices that determine how information is to be used and spread among the team (Andler, 2012; Landemore, 2012). TWM has the potential to transform the disarranged information to so that wisdom-related mechanisms can turn an organized one so that it can be used more effectively for making decisions (Ghobadi & Mathiassen, 2017; Wang, Sun, Shen, & Zhang, 2018). TWM can help find solutions to any conflicts among members, harvesting innovation (Song, Dyer, & Thieme, 2006)and promises the performance of projects and firms (Gardner, Gino, & Staats, 2012; Huckman, Staats, & Upton, 2009; Lalonde, Bourgault, & Findeli, 2012; Paulus, Dzindolet, & Kohn, 2012). This shows that TWM is positively linked to IP. Hence the hypothesis:
H1: TWM has significant association with IP

2.3 Mediation of Team Prudence (TP)

TP is the collective information possessed by the team members for any specific problem. This helps the teams to make decisions freely and can take actions timely (Eikeland, 2006; Nonaka & Toyama, 2007). TWM can increase the sharing of tacit knowledge among the team (Olaisen & Revang, 2018; Ryan & O'connor, 2009) and can integrate relevant knowledge collected through other internal and external domains (Šmite, Moe, Šāblis, & Wohlin, 2017), thus leading to improved levels of innovation (Hussain, Konar, & Ali, 2016). TWM have been proved to positively relate to TP (Akgün, 2020; Hogan, Raza, & Driskell, 1988; Hogan & Shelton, 1998; Neuman, Wagner, & Christiansen, 1999). Studies by (Dalal & Pauleen, 2019; Ralph, 2018) have shown that TP is clearly linked to the innovation success of the firms (Akgün, 2020). Hence, TP can be tested as a mediating variable and the study gives the hypothesis:
H2: TP significantly mediates the association of TWM and IP

2.4 Mediation of Team Intuition (TI)

TI is one of the factors of 'Joint epistemic actions' that are based on the basic concept of wisdom in psychology and focuses on the actions taken regarding this

wisdom (Proust, 2014). In these actions, the members of team can express their real beliefs about problems using practical information from internal and external sources. Resultantly, they produce flexible and innovative opinions which can be changed according to the nature of situation being faced, promoting IP. Wisdom enables teams to simplify the issues and solve them more effectively (Akgün, 2020; Olaisen & Revang, 2018; Ordóñez de Pablos & Lytras, 2018). This shows that TWM promotes TI which has positive relations with performance. So, TI can serve as potential mediator in this relationship and the study has hypothesized:
H3: TI significantly mediates the association of TWM and IP

2.5 Mediation of Team Virtue (TV)

TV is a major part of the wisdom philosophy conceived by Aristotle (Bredillet, Tywoniak, & Dwivedula, 2015; Rooney & McKenna, 2008; Rowley, 2006). TV can be defined as the tendency of the team to behave on ethical grounds (Akgün et al., 2019; Weaver, 2006). Studies have shown that TWM is positively related to TV (Akgün, 2020), because it increases the morality of members by developing their understanding of ethics in their interactions with each other. This allows the members to think over if their decisions affect other members and how they must work together by applying the knowledge for success of the team and firm (Nielsen, Edmondson, & Sundstrom, 2006; Zhang & Guo, 2019), hence cultivating innovation (Awan & Akram, 2012; Silver, 2010). This shows that TV can lead to improved IP and its mediating impact can be checked in this relationship. So, the study has hypothesized:
H4: TV significantly mediates the association of TWM and IP

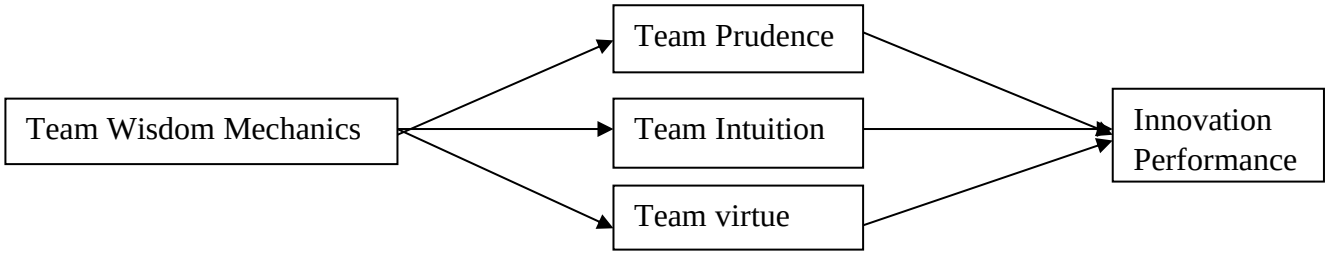

Figure 1.2: Conceptual Framework

Methodology

3.1 Data source

Data for this research was collected from pharmaceutical firms of Thailand. That is rapidly growing market and face many challenges such as competition and innovation. Target for this research were large scale pharmaceutical firms of Thailand. Taking into use of convenient sampling technique 540 managers from pharmaceutical firms were drafted in sample. This survey was mainly directed towards senior managers, top managers, supervisors and team leaders for more authentic organizational information. At the start, some team members were consulted to understand the practical implication and possible issues faced by firms. Then, self-administrative questionnaire was developed according to the research variables. It was developed very carefully to avoid any error. Questionnaires were delivered by research

team in the firms that also explained the research basic information. Thailand pharmaceutical association imparted contact details of these firms. Five hundred survey copies were disseminated. When the data collection phase was completed, gathered responses were screened 190 incomplete questionnaires were rejected and rest were retained for analysis. Further it was seen that 280 were male (51.8%), and 260 were female (48.2%). Most respondents were 31–40 years old (31.1%), and respondents (42.3%) had post-graduation qualification. Most of the respondents had approximately 5 years of work experience (44.8%).

3.2 Instruments

To examine the proposed hypotheses, multi-item scales that were either adopted from the prior literature or revised were utilized. 5-pointLikertscalerangingfrom "strongly disagree" (1) to "strongly agree" (5).

Virtue team of the firm is validated in this study four items were adapted from Akgün and Lynn (2002) to measure Team virtue. A sample item is "Team members are concerned about the role of ethics and virtue in our team.". Results showed Cronbach's Alpha is 0.92 reported on 5 response scale. Team prudence incorporated Sanne et al. (2010) scale and measured team's prudence with four items including Team members have rich factual knowledge about their areas in our team" respondents rated team's discipline and carefulness on 5 Likert scale showing reliability of α=0.820. Items for Innovation performance measurements were adapted from Miller and Friesen (1982). Utilizing 5 items modified measure the level of Innovation Performance. Innovation performance reflects the new products, process and technologies used in firms. Results showed α =0.83 for innovation performance. Three items were drawn from Dayan and Elbanna (2011) and changed to explore Team intuition that how intuition impact team members decision making . An item is "Team members put more emphasis on feelings than data when making decisions". Informants recorded their responses on 5-Likert scale. Cronbach's Alpha is 0.92.

Team wisdom mechanism was evaluated by three dimensions Team networking, Team diversity and team experience. This construct make use of scale confirmed by Peterson, Smith, Martorana, and Owens (2003), total 11 items were applied after making changes, one sample question is "to what extent did your team members have social networks with other project team members?" results indicated α=0.96 as composite reliability.

3.3 Analysis

For data analysis of key research constraints statistical software AMOS and SPSS were used in this study as to draw graphical models and for quick valuation for different analysis and results. Initially scales were tested by running an exploratory factor analysis and was further checked using CFA. Overall, the measurement models' assessment results satisfied the reliability requirements.

Data Analysis

4.1 Demographics

The frequency distribution of respondents is estimated on SPSS in order to identify the participation of respondents based on their demographic characteristics. The dataset based on 540 responses among which the contribution of male respondents is 55.1 percent and contribution of female respondents is 44.9 percent. as far as

frequency distribution in terms of age is concerned, the most of the respondents fall in age range of 31-35 years. In terms of education, the share of graduate respondents are 47.1 percent, where share of under graduate is just 14.0 percent, which indicates that most of the respondents are highly educated.

4.2 Descriptive Statistics

Table I indicates the descriptive statistics or summary of data. The table indicates the central tendency, minimum, maximum values, and normality is data. The findings of analysis indicates that all items are recorded on five point likert scale. The mean values of measures indicate that most of the respondents were slightly agree with survey questions. Moreover, the values of skewness are also in acceptable range of normality.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
InnPer	399	1.00	5.00	3.472	1.215	-.389	.122
TeaIntu	399	1.00	5.00	3.365	1.128	-.497	.122
TeaVirt	399	1.00	5.00	3.288	1.212	-.520	.122
TeaPrud	399	1.00	5.00	3.437	1.245	-.516	.122
TeaWisMech	399	1.00	5.00	3.426	1.112	-.563	.122
Valid(N) (listwise)	399						

4.3 Factor Loading and Convergent Validity

Table 2 indicates the empirical findings of composite factor analysis, composite reliability and average value extracted from variance (Hassan, Hameed, Basheer, & Ali, 2020; Iqbal & Hameed, 2020). Column 1 denotes the all survey items (questions) of team wisdom performance are highly loaded on innovation performance construct, which indicates that items of team wisdom mechanism is highly correlated with innovation performance. Likewise the column two indicates the correlation of items of innovation performance with construct of team virtue, thus it indicates that items of innovation performance are highly loaded on factors of team virtue. The composite reliability denotes that most of the measures have valid construct as the values of CR for each measures is higher than 0.7. Average Variance Extracted (AVE) of each measure indicates discriminant validity. Discriminant validity referred to the degree to which measures of different dimensions are distinct from each other. The values of AVE also confirm discriminant validity in model.

Table 2: Factor Loading and Convergent Validity

	1	2	3	4	5	CR	AVE
IP1		.854				0.919	0.845
IP2		.858					
IP3		.871					
IP4		.872					
IP5		.856					
TI1					.824	0.926	0.807

TI2				.763		
TI3				.778		
TV1		.828			0.931	0.834
TV2		.831				
TV3		.834				
TV4		.821				
TP1			.816		0.913	0.838
TP2			.831			
TP3			.821			
TP4			.832			
TWM1	.747				0.931	0.743
TWM2	.788					
TWM3	.753					
TWM4	.791					
TWM5	.772					
TWM6	.766					
TWM7	.777					
TWM8	.784					
TWM9	.781					
TWM10	.794					
TWM11	.751					

4.4 Discriminant Validity

Table 3 indicates the matrix of composite factor analysis, which is estimated to explore discriminant validity in data. In matrix the values of diagonal are higher than off diagonal values which indicates that the issue of cross loading are not found in measures and discriminant validity is confirm. Discriminant validity indicate that measures are not related with other factors with which it ought not to relate.

Table 3: Discriminant Validity

	TP	IP	TI	TV	TWM
TP	0.968				
IP	0.638	0.970			
TI	0.600	0.588	0.898		
TV	0.621	0.604	0.593	0.968	
TWM	0.690	0.656	0.727	0.701	0.861

4.5 Confirmatory Factors Analysis and KMO

Table 4 indicates the findings of composite factor analysis and KMO (Kaiser-Meyer-Olkin Test). The model fitness test such as CMIN/DF, GFI, IFI, CFI, RMSEA indicates the strength and health of model. The values of model fitness tests confirm that model is fit for analysis as the values lies in acceptable range. Where, the KMO test checks the relevancy of data for Factor Analysis and to confirm the adequacy of sample data. The satisfactory range to authorize that sample is adequate for factor analysis is 0.6 to 1.0, and for this model it is suffice to confirm that sample is adequate for factor analysis.

Table 4: Confirmatory Factors Analysis and KMO

CFA Indicators	CMIN/ DF	GFI	IFI	CFI	RMSEA	KMO
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08	0.6 – 1.0
Observed Value	2.970	0.874	0.972	0.970	0.072	0.932

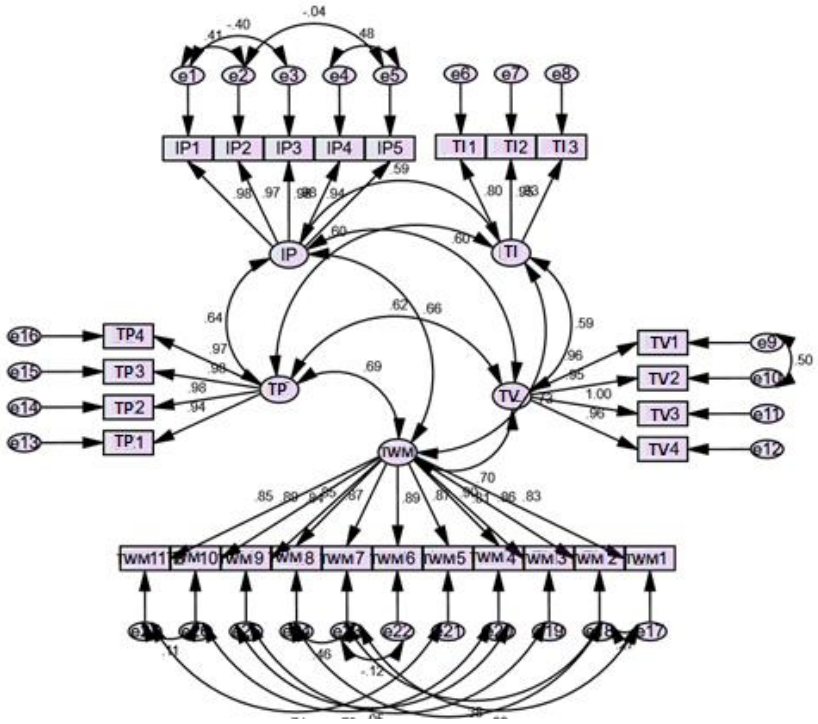

Figure 1: CFA

4.6 Structural Equation Modeling

Table 5 indiactes the regression coefficients of latent construct estimated through structural equation model. The results indiactes that team wisdom mechanisim has significant impact on the team prudence, team virtue, and team intution. The coefficients indicate that one unit incraese in team wisdom mechanisim will cause 66.0, 69.0, and 68.4 percent incraese in team prudence, team virtue, and team intution, respectively. Thus team wisdom mechansim has signifixant direct imapct on mediating varaibles. Inaddition, all the medaiting varibles has signifixcant positive imapct on innovation performance. The coeffcients of mediating varaibles indicate that one unit incraese in team prudence, team virtue, and team intution will cause 28.2, 20.8, and 13.2 percent incraese in innovation performance, respectively. Moreover, the direct imapct of team wisdom mechanisim on innovation perforamnce is positive and significant.

Table 5: Structural Equation Modeling

Path			Estimate	S.E.	P	Decision
TeaPrud	<---	TeaWisMech	.666	.044	.000	Accepted
TeaVirt	<---	TeaWisMech	.691	.041	.000	Accepted
TeaIntu	<---	TeaWisMech	.684	.039	.000	Accepted
InnPer	<---	TeaWisMech	.233	.074	.000	Accepted
InnPer	<---	TeaPrud	.282	.046	.000	Accepted
InnPer	<---	TeaVirt	.208	.049	.000	Accepted
InnPer	<---	TeaIntu	.132	.052	.006	Accepted

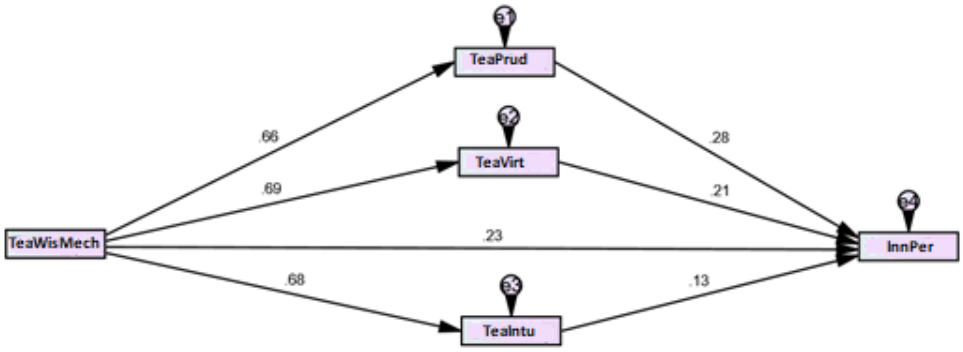

Figure 2: STWM

Discussion and Conclusion

5.1 Discussion

Team wisdom (TW) plays a significant role in enhancing different relationships between different entities and also enhances the overall performance of the team and firm. According to previous research by Kumari (2017), team wisdom is the ability of an organization or its team to work efficiently together to achieve common goals and objectives. Tem wisdom enables the members of teams to share knowledge and silks to improve the overall performance of the team which directly influences the performance of the firm. According to the initial results of the study, it has been suggested that the impact of the team wisdom mechanism has been positive on the innovation performance of the sector. Team wisdom mechanisms can positively be linked with team virtue and also enhances the morale of team members during the process of innovation, so, with this advantage; the innovation performance of the firm will automatically be improved (Salas & Bisbey, 2019). Therefore, the hypotheses regarding the direct impact of team wisdom mechanism on innovation performance have been accepted and supported to findings.

Furthermore, the outcomes of the study also suggest that team virtue and team intentions positively mediate the relationship between TW mechanism and innovation performance. Team virtue and intentions can provide benefits to firms in many ways such as by motivating the actions of other employees that work in the process of innovation.

5.2 Conclusion

The study suggests that the team Wisdom mechanism has a great and very effective role in the sense of innovation performance. This technique enhances the strategies of the firm and the industries by the means of Team Prudence, Team virtue, team intention. The research shows that innovation Performance increases when there are such rules adopted by the management to take the industry at a high rate of performance.

5.3 Implications and Limitations

The given study has a very positive impact when adopted by firms and industries. These techniques are very positive and effective to produce positive results. This study also opens the various dimensions for the future researchers and the industries to work on it and to lead the financial aspect of the firm is a very positive way.

There are some methodological limitations of this study that should be addressed by future researches and its analysts. First, this study used cross-sectional nature that cannot provide the causality between different dependent and independent variables, so, due to this limitation future studies should use a longitudinal type of study for better results. Second, this research is limited to the role of team wisdom and its mechanisms in the pharmaceutical sector of Thailand. Future analysts should add another type of independent variable to calculate more accurate results and suggestions.

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