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Consumers' Attitudes towards Green Food production in China:

A test of the values-attitudes hierarchy

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Abstract

Green food is perceived by Chinese consumers as environmentally friendly and safe to consume. Through a hierarchical values-attitudes model, the paper examines the degree to which attitudes towards green food is determined by consumers' values and their general attitudes towards environment and nature and technological progress. The link between collectivism, attitudes towards environment and nature, and attitudes towards green food is the strongest link of the hierarchical model. However, collectivism also influences attitudes towards technological progress, which in turn influence attitudes towards green food. This finding, coupled with the lack of significant relationship between individualism and attitudes towards technological progress point towards the conclusion that the belief of Chinese people that technology is a positive determinant of food safety and environmental friendliness in food production steams from altruistic predispositions, which in turn influence (positively) Chinese consumers' attitudes towards technology.

Introduction

Economic growth and the transition to a market economy might explain the significant changes in parts of the Chinese society becoming more sensitive and responsive towards environmental issues (McEwen et al, 2006). Moreover, food safety is an even more pressing social issue. Excessive use of chemicals at the farm level, pest and disease breakouts, low domestic food safety standards, and the difficulty to ensure safety throughout the supply chain lead to a series of food safety incidences, fuelling public concerns about edible's quality.

In China there are three different types of food in terms of environmental friendliness and safety of consumption, owing to different standardization systems in place (Xu and Wu, 2010): normal, green and organic. Normal food has measurable standards of quality and sanitation, yet these relate only to the primary production stage. Green food implies planting or breeding under zero environmental pollution conditions, and processing according to normal sanitary standards. Caught between the two, organic food develops slowly due to its unclear market positioning. Overall, while it might be questionable to claim that normal food is absolutely safe, this is not the case with green and organic food. Consequently, the terms green and organic are used by Chinese consumers interchangeably to simultaneously cease their environmental and safety concerns.

In this respect, the objective of the present work is to comprehensively analyze Chinese consumers' attitudes towards "green" food production, due to the Chinese "peculiarity" to consider those foods not just environmentally friendly but also safer than "normal" food. This duality in consumer perceptions about green food offers fertile ground for further research into the relationship between attitudes specific to green food and its hypothesized antecedents, namely attitudes towards environment (tackling the environmental friendly nature of green food) and attitudes towards technology (reflecting the consumption safety perception about green food), as well as the personal values that motivate each of the later general attitudinal constructs.

What makes researching this hierarchical values-attitudes relationship further

challenging is the fact that - from a Western evidence-based point of view – the two general attitudinal constructs towards environment and technology respectively are contradictory in nature and they should "normally" not coincide as determinants of consumer attitudes towards green products, mainly because attitudes of "affective" nature – i.e. appealing on emotions – and of "cognitive" nature – i.e. appealing on rational thinking – underlying food tend to oppose each other (Rozin et al., 1999; Sparks et al., 1992). For instance, people liking food for its sensory qualities (a component of affective nature) will tend to dislike foods that are good for health (a component of cognitive basis) and conversely (Dubé et al., 2003). In a similar vein, green foods (e.g. organic) will be perceived as opposite to foods that are the outcome of technology-driven, intensive production systems (e.g. genetic modification), making attitudes towards technology rather irrelevant as predictor of attitudes specific to green foods.

Moreover, affective or cognitive attitudes will in their turn be determined by different sub-sets of consumers' personal values: egalitarian, self-transcendence values guide environmental attitudes more than technological attitudes, whereas the opposite should be the case with selfish, self-promoting value orientations. In sum, the "egalitarian values – attitude towards environment" relationships is more meaningful hierarchical orientation than incorporating selfish values and technology attitudes when green food is the attitude object.

Following this line of thought, the present paper builds on a hierarchical values-attitudes model with the aim to examine the degree to which consumer *attitudes towards green food* is *jointly* determined by a combination of consumers' *personal values* (egalitarian or selfish) and their general attitudes towards *environment and nature* (affective attitude) and *technological progress* (cognitive attitude). Furthermore, the paper aims to examine whether the direction of the relationships between relevant value-attitude dyads and attitudes towards green food in China is as it would be expected from Western empirical evidence-based points of view.

This paper will first present a relevant literature review, to substantiate specific research objectives and the development of the conceptual values-attitudes hierarchical model to be tested. Next, methodology and results will be discussed. A Discussion section will follow. Finally, research limitations and directions for future research will be presented.

Literature review

Attitude represents a disposition to respond favourably or unfavourably to an object, person, institution or event and it is considered to be a construct of evaluative nature (Ajzen, 1988), i.e. individuals can have a positive or negative attitude towards the outcome of a specific behaviour. Attitudes are crucial because of their assumed relation to behaviour. The connection between attitudes and behaviour has been discussed continuously in the social and behavioural sciences over the past fifty years or so.

Although consumer attitudes were still viewed for long as a uni-dimensional evaluative construct, over the last 20 years there has been a significant shift away

from this view, in favour of the discrimination between the affective vs. cognitive - or utilitarian vs. hedonic - bases on which attitudes are formed and changed. The affective component pertains to the sensations, feelings and emotions that one experiences in response to an attitude object. For food attitudes, for instance, these may be the hedonic element of consumption, the pleasure of sharing it with friends or ethical consideration of food production methods. The cognitive component of attitudes contains the positive and negative attributes and beliefs about the target. In the food domain, these relate to attributes like nutritional value, health consequences, or convenience of use. Since then, there has been a rich diversity of multi-item scales that have been developed in the consumer (e.g. Badin et al., 1994; Batra & Ahtola, 1990; Leclerc et al., 1994) and psychology (Crites et al., 1994; Millar & Millar, 1990) literature to assess affective and cognitive bases.

Taking food as an example, Dubé et al. (2003) essentially distinguished among four types of evaluative attitudes towards food consumpiton: a) cognitive/deliberate (i.e. more elaborated, with long-term effects, for instance food healthiness), b) cognitive/immediate (i.e. more elaborated but with immediate consequences, for instance convenience of consumption), c) affective/deliberate (i.e. emotional representations, for instance food-related memories from childhood), and d) affective/immediate (i.e. sensations, for instance taste and overall hedonic experiences).

The present work endorses the classification of attitudes by Dubé et al. (2003) into the four sub-types described above. As it was described in the Introduction and will be further explained in the following sub-sections, of special interest to the present study are two types of attitudes that pertain to the issues of food safety and environmental friendliness under study: a) attitudes towards environment and nature; and b) attitudes towards technological progress. We postulate that the former constitute affective/deliberate attitudes, appealing on emotional/ethical long-term consequences of food consumption (i.e. environmental sustainability), and the later constitute cognitive/immediate attitudes, more elaborated, with almost "automatically" assumed consequences (i.e. safety of consumption).

Construction of the hierarchical value-attitudes model and study objectives

Research dealing with consumers' interest in and choice of green food in a Western context is not rare (e.g. Baker et al., 2004; Beckmann et al., 2001). Several authors (e.g. Grunert, 1993; Grunert & Juhl, 1995; Hopper & McCarl, 1992; Schwartz, 1992; Thøgersen & Beckmann, 1997) have suggested that personal values influence people's environmental attitudes, which in turn affect (usually positively) attitudes buying intentions and behaviour towards green food (solely defined as environmentally friendly food, such as organic). On the other hand, research in non-Western cultural environments appears only occasionally in the literature (e.g. Mostafa, 2007; Thøgersen & Zhou, 2010). Nevertheless, there is no empirical evidence as yet about the extent to which these findings apply in the Chinese food consumption context. Especially in relation to the issue of safe food consumption, there is nearly no research evidence probing into the individual motivational factors that influence the consumers' interest in food production and safe food purchasing.

Given the profound impact of cultural values on food-related attitudes of the Chinese consumers (e.g. Sun & Collins, 2002), their possible influence on the green purchase behaviour will form the starting point in this study's model (Figure 1). As a direct outcome of Western studies, the model first postulates direct causal relationships between egalitarian values of Chinese consumers and their affective/deliberate attitude towards environment and nature ("Collectivism - AttEnvir") and between self-promoting values and cognitive/immediate attitudes towards technological progress ("Individualism - AttTech").

Then, since affective and cognitive attitudes are seen in China as together contributing (deliberately and immediately respectively) to an individual's balance in life, attitudes towards environment and nature, and towards technological progress are assumed to *jointly* influence consumer attitudes towards green food ("AttEnvir – AttGreen" and "AttTech - AttGreen" respectively). This assumption is particularly important, since it reflects the dual character of green food in Chinese consumers perceptions (i.e. environmentally friendly and safe to consume).

Finally, due to the cultural context of the study, our model precludes the existence of value-attitude hierarchical relationships that would reflect the synergetic influence of values and attitudes on lower-abstraction, affective and cognitive attitudes – similarly to the way the latter are assumed to jointly influence attitudes to specific products types (i.e. green foods). Thus, two further links are tested in the model: one between egalitarian values and cognitive/immediate attitudes ("Collectivism – AttTech") and one between self-promoting values and affective/deliberate attitudes ("Individualism – AttEnvir"). The strength and direction of those relationships will also allow us to further compare the values-attitudes hierarchy of the Chinese consumers to that of Western consumers.

Methodology

Data collection has concentrated on six cities across the country (Nanjing, Chengdu, Wuhan, Changchun, Beijing, and Guangzhou), as this is where the current changes in eating habits are predominantly taking place and where most of the purchasing power is concentrated. Accordingly,

The questionnaire used for the purposes of the present paper includes three sections: a) the first section included higher-order, affective/immediate and cognitive/deliberate attitudes towards *environment and nature* and *technological progress*, as well as lower-abstraction consumer attitudes towards *green food* (in total 13 items; see details bellow); b) the second section included the 21-item version of Schwartz's Portrait Value Questionnaire used in the European Social Survey (PVQ, 21 items); and c) the third section included socio-demographic characteristics of the respondents (10 items).

The higher abstraction (affective/deliberate) attitude towards environment and nature is measured using a reduced five-item version of the New Environmental Paradigm (NEP) scale (Dunlap, 2000). The higher abstraction (cognitive/immediate) attitude towards technological progress is measured with five items used by Hamstra (1991). Moreover, the lower abstraction attitude specifically towards green food is measured with a three-item scale obtained from Lindeman and Väänänen (2000). The

scales described above have been tested in many countries and were found to exhibit stability and cross-cultural validity. All the attitudinal items are measured on 7-point Likert-type agreement scales, with end-points 1= "*completely agree*" to 7= "*completely disagree*". The PVQ value items are measured on a 6-point similarity scale with end-points 1= "*very much like me*" to 6= "*not like me at all*" (Schwartz, 1992). The exact phrasing and descriptive statistics of the 34 items of the model and their postulated organization in latent constructs can be seen in Table 1.

The master questionnaire was developed in English and translated into Chinese through the process of back-translation. Data was collected by personal interviews in the six cities chosen. The field work was mainly done by local researchers, carried out between January and March 2008. In each city, 80 personal interviews with respondents were carried out inside food retail outlets during consumers' shopping trips. The samples are equally divided by gender. Each interviewee filled in the questionnaire under the guidance and supervision of the interviewer. Average time for questionnaire completion was approximately 50 minutes.

A total number of 479 respondents answered the questionnaire, equally distributed among the six cities (16.7% in each). Female respondents represented 49.9% of the total sample. Mean age of the sample is 39 years (SD=11.8). Respondents' education was unevenly distributed between regions. Those who lived in Beijing mostly had a higher education level (52.5 percent); moreover, this category represents the majority of the sample in most of the cities. Since nearly 85 percent of the respondents are under 50 years of age, the higher education level of the sample should be expected.

Analysis and results

The data set was first checked for outliers and missing values. The internal consistency of the various constructs was assessed by Cronbach Alpha coefficients (SPSS 15.0). Confirmatory Factor Analysis (CFA) was performed (LISREL 8.72) to confirm the factorial pattern suggested in the structural model for the values and the attitudes parts of the model. Structural Equation Modelling (SEM) is then performed (LISREL 8.72) to investigate the hypothesised relationships among attitudes towards green food and their antecedent general attitudes and values. The observed variables are slightly non-normal, with some kurtosis and skewness indices > |1| to around |2|. Maximum Likelihood (LISREL 8.72) with its robust correction for non-normality (Robust Maximum Likelihood - RML; Satorra and Bentler, 1994) is thus used as method of model estimation.

Cronbach alpha scores for the 11-item collectivistic value factor and the 10-item individualistic value factor are high (0.770 and 0.840 respectively, see Table 1). Moreover, all alpha-if-item-deleted scores for the respective items of the two value factors are lower than those scores, indicating that no value items should be excluded from further analyses. Cronbach alpha scores for the three attitudinal scales (attitudes towards: environment and nature; technological progress; and green food) are satisfactory (i.e. 0.698, 0.663 and 0.720 respectively).

CFA analysis on the PVQ value domains took place first, in order to configure the postulated factors of collectivism and individualism. The fit of the CFA model is

acceptable (Normal Theory Chi-Square $_{[186]}$ = 884.24, p<0.001; Satorra-Bentler Scaled Chi-Square $_{[186]}$ = 710.36, p<0.001), with CFI = 0.93, NNFI = 0.92 and RMSEA = 0.077 (cut-off values greater than 0.90 for CFI and NNFI and lower than or equal to 0.08 for RMSEA are adequate for model fit; Bentler, 1990; Hu & Bentler, 1999). The standardized factor loadings are also much lower than the cut-off value of 0.95, assessing convergent validity (Kline, 2005). Moreover, the estimated correlation between the two value factors is also bellow the cut-off value of 0.85, satisfying discriminant validity (Kline, 2005) (Table 2).

CFA analysis on the attitudinal domains took place after, in order to configure the postulated factors of general and specific attitudes. The correlations of two items (i.e. "*The balance of nature is strong enough to cope with the impacts of modern industrial nations* (ATTENV2) and *"The so-called "ecological crisis" facing humankind has been greatly exaggerated* (ATTENV3)), with the attitude towards environment and nature construct are found not statistically significant. Upon their exclusion, the fit of the CFA model is very good (Normal Theory Chi-Square $_{[40]}$ = 140.99, p<0.001; Satorra-Bentler Scaled Chi-Square $_{[40]}$ = 102.17, p<0.001), with CFI = 0.96, NNFI = 0.95 and RMSEA = 0.057. The standardized factor loadings are also lower than the cut-off value of 0.95, assessing convergent validity. Moreover, the estimated correlations among the three attitudinal factors are also bellow the cut-off value of 0.85, satisfying discriminant validity (see Table 2).

Structural Equation Modelling results

SEM analysis on the postulated values-attitudes hierarchical model as described above took place last. The fit of the SEM model is good (Normal Theory Chi-Square $_{[456]}$ = 1601.48, p<0.001; Satorra-Bentler Scaled Chi-Square $_{[456]}$ = 1312.80, p<0.001), with CFI = 0.91, NNFI = 0.90 and RMSEA = 0.063. In the measurement model, all standardized factor loadings are lower than the cut-off value of 0.95, assessing convergent validity as in the CFA models the SEM measurement model results from. Similarly in the structural model, the estimated correlations between the two value factors (X-model) and among the three attitudinal factors (Y-model) are also bellow the cut-off value of 0.85, satisfying discriminant validity (see Figure 2).

6. Discussion and conclusions

Validating past results, the model postulated here supports the view that particular value orientations are associated with consumer attitudes towards green food. Specifically, the indirect link between collectivistic values and attitudes towards green food is the strongest one, constituted by two strong and positive correlations between collectivism and attitudes towards environment and nature; and between the latter and attitudes towards green food. In this respect, general attitudes to environment are clear determinants of specific attitudes towards green food, as also postulated by past research.

However, the most interesting finding of the work is the fact that collectivistic values also influence general attitudes towards technology, which in turn influence specific attitudes towards green food. This finding points out towards Chinese people (positive) stance towards technology as being a direct determinant of (positive) green food attitudes, contrary to what one would expect from Western populations.

Moreover, an equally important finding of the present work is the fact that individualistic value orientations do not seem to relate to attitudes to green food. Although such a result should be expected in what concerns the link between individualistic values and attitudes towards environment, the lack of significant relationship between individualism and attitudes towards technology is striking, also pointing towards the above discussed belief of Chinese people that technology is a positive determinant of food safety (embodied into green foods), and that interest in technology steams from mainly altruistic predispositions.

The study findings are of particular academic value, since there is no empirical evidence as yet about the exact relationships that govern how values and general attitudes influence attitudes towards green food in the Chinese food consumption context. The results also offer face validity to the selection of attitudes towards environment and technology as determinants of attitudes to green food, reflecting the peculiarity of green food being perceived in China as safe to consume besides its unquestionable environmental friendliness. Future research should try to incorporate more attitudinal constructs (e.g. attitudes towards the food industry) that have the potential to determine Chinese consumer attitudes towards green food, as well as intentions and behaviour.

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Tables and Figures

Table 1: Scales' description, reliabilities and mean scores (N=479)

VALUES [a]	
Collectivistic values **Cronbach alpha:**	**0.770**
Benevolence	
1. It is very important to him to help people around him. He wants to take care for their well being	2.50
2. Loyalty to friends is very important to him. He wants to devote himself to people close to him	2.40
Universalism	
3. Listening to opinions different from his is important for him. He would try to understand others opinion even if he does not agree with what they say	2.93
4. He thinks it is important that all people in the world gets the same treatment He believes everyone should enjoy equal opportunity in life.	2.64
5. He believes that everyone should care about nature. The protection of ecological environment is rather important for him.	2.58
Security	
6. Living in a secure environment is important for him. He would do his best to avoid anything that will endanger his safety.	2.77
7. It is important to him that the government ensures his safety against all threats. He wants the state to be strong so it can defend its citizens.	2.45
Conformity	
8. He believes that people should do as others say and abide by the rules even if no one is watching aside.	2.97
9. Dignified manner is important for him. He would do his best not to do things others think wrong.	2.77
Tradition	
10. Modest is important for him. He would do his best not to arouse others attention.	3.02
11. Tradition is important to him. He tries to follow the customs handed down by his religion or his family.	2.92
Individualistic values **Cronbach alpha:**	**0.840**
Self-direction	
12. Making decisions on one's own is important for him. He likes freedom and independent.	2.68
13. To have new ideas and be innovative is important for him. He likes to do things in his own way.	3.15
Stimulation	
14. He likes surprises and is always looking for new things. He thinks it is important to do many different things in life.	3.27
15. He likes and also often looks for adventurous activity. He hopes to have an exciting life.	3.79
Hedonism	
16. To enjoy happiness is important for him. He favours himself.	3.99
17. He seeks every chance he can to have fun. It is important to him to do things that give him pleasure.	2.92
Achievement	
18. To show oneself is important for him. He wants people to admire what he does.	3.53
19. For him, to be successful in career is important. He likes to give others a good impression.	2.48
Power	
20. To be rich is important for him. He wants to possess a lot of money and expensive things.	3.65
21. For him, to gain respect from others is important. He likes others to do as he says.	3.41

ATTITUDES [b]	
Attitude towards environment and nature	
Cronbach alpha:	**0.698**
1. Humans are severely abusing the environment	2.79
2. The balance of nature is strong enough to cope with the impacts of modern industrial nations (R)	3.65
3. The so-called "ecological crisis" facing humankind has been greatly exaggerated (R)	3.69
4. The earth is like a spaceship with very limited room and resources	2.34
5. If things continue on their present course, we will soon experience a major ecological catastrophe	2.80
Mean	**2.65**
Attitude towards technological progress	
Cronbach alpha:	**0.663**
1. The degree of civilization can be measured from the degree of technological development	3.14
2. New technological inventions and applications make up the driving force of progress of society	2.52
3. In (country) we are probably better off than ever thanks to the tremendous progress in technology	3.33
4. Throughout the ages, technological know-how has been the most important weapon in the struggle for life	2.63
5. Because of the development of the technology we will be able to face up to the problems of tomorrow's society	3.12
Mean	**2.95**
Attitude towards green food	
Cronbach alpha:	**0.720**
1. It is important that the food I eat on a typical day has been prepared in an environmentally friendly way	2.65
2. It is important that the food I eat on a typical day has been produced in a way which has not shaken the balance of nature	2.74
3. It is important that the food I eat on a typical day is packaged in an environmentally friendly way	2.52
Mean	**2.64**

a: 1 = "very much like me" to 6 = "not like me at all"

b: 1 = "strongly disagree" to 7 = "strongly agree"

R: reversed items

Table 2: Correlations between factors, N=479

	CFA models				
	Collectiv.	Individ.	AttEnv.	AttTech.	Inter.
Collectiv.	1				
Individ.	**0.74**	1			
AttEnv.			1		
AttTech.			**0.61**	1	
AttGreen.			**0.34**	**0.33**	1
	SEM model				
	Collectiv.	Individ.	AttEnv.	AttTech.	Inter.
Collectiv.	1				
Individ.	**0.75**	1			
AttEnv.	**-0.46**	**0.21**(*)	1		
AttTech.	**-0.32**	**0.11**(*)	**-**	1	
AttGreen.	-	-	**0.29**	**0.17**	1

*: not significant, $p<0.01$

Key: Collectiv. = collectivistic values, Individ. = individualistic values, AttEnv = attitudes towards environment and nature, AttTech = attitudes towards technological progress, Int. = interest in "green" food

Figure 1: The conceptual value-attitude model

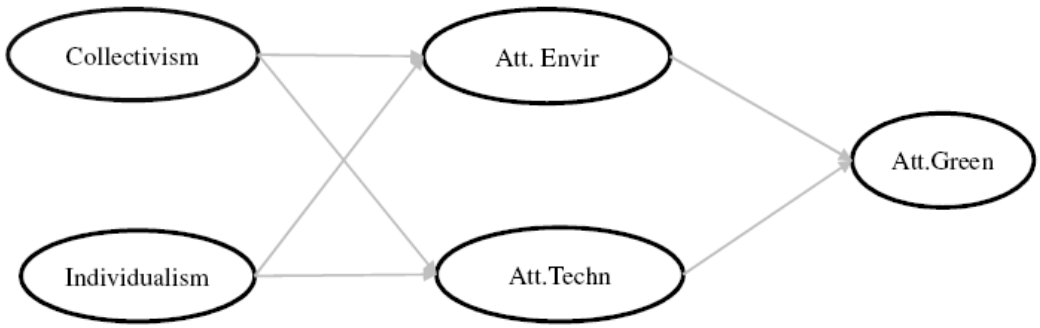
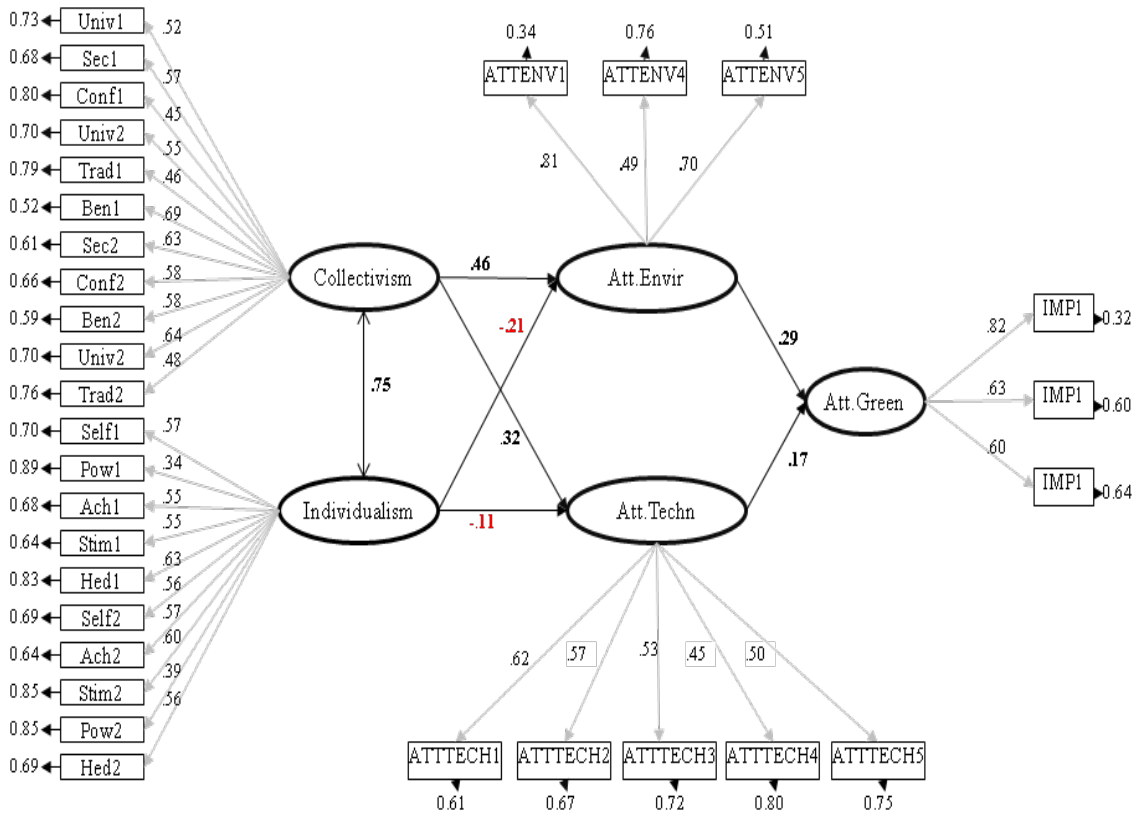


Figure 2: Overall fit of the SEM model and path coefficients of the relationships



Chi-square=1312.80, df=456, P-value=0.00000,
RMSEA=0.063

Note: values in red characters indicate non statistically significant relationships