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Relationship between the dominant social paradigm, materialism and environmental behaviours in four Asian economies

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Abstract:

Purpose

– This paper's aim is to test the relationships between the Dominant Social Paradigm (DSP), materialism, environmental concern, and environmental behaviours, in four Asian economies. It examines the relationships between these constructs and identifies that the model of the relationship is applicable in regions with different cultural foundations.

Design/methodology/approach

– A sample of 1,174 consumers from four Asian economies with a strong Chinese background – mainland China (364), Hong Kong (260), Taiwan (289), and Singapore (261) – were recruited through an international online panel provider. Structural equation modelling was used to test the hypothesised relationships in the proposed model.

Findings

– The relationships within the model were all confirmed, with the exception of the link between the DSP and environmental concern, which was positive, which suggests that within these Asian economies there may be a realisation that consumption and the environment are intertwined. DSP was found to influence the dimensions of materialism and materialism negatively impacted on environmental concern. Environmental concern in turn increased direct and indirect environmental behaviours.

Originality/value

– This research is the first to look at the application of the Dominant Social Paradigm in Asian economies and shows that it applies in that context, although the relationships do differ to those identified in past research in Western economies. The model linking the DSP, materialism, environmental concern and environmental behaviours showed that most relationships are generalisable. However, the positive relationship between the DSP and environmental concern suggests that consumers in Asian economies appear to make a connection between consumption and its environmental impacts.

Introduction

Most researchers agree that human consumption has a significant, negative impact on the natural environment and contributes to environmental degradation (Stern, 2000). This has not gone unrecognised by consumers who, globally, are purported to have increasing levels of environmental concern (Kilbourne et al., 2009; Schultz et al., 2005), and are increasingly seeking to integrate environmental factors into their decision-making and consumption (Polonsky et al., 2012). However, there is an argument that less environmentally harmful consumer behaviour will not truly occur as long as marketers focus on the creation of exchange which is embedded in consumers believing that the acquisition of material wealth (i.e. materialistic values) improves their wellbeing or quality of life (Wang and Wallendorf, 2006). This is an even broader issue as the connection between materialism and happiness is tenuous, that is, consumers in the wealthiest countries are far from the happiest (Haller and Hadler, 2006).

Examining consumption generally or in regard to environmentally focused consumption, must take into consideration the broader societal, political and economic environment. How these factors are institutionalised within societal, political and economic structures, has been referred to as the dominant social paradigm (DSP) (Kilbourne et al., 1997). The DSP and other underlying values such as materialism, therefore, influence how consumers perceive the natural environment and thus their environmental concern. This concern, in turn, shapes consumers' intentions to behave more responsibly and, theoretically, their intentions to consume in a less environmentally harmful fashion which should then shape alternative types of consumer behaviour (Polonsky et al., 2012; Thøgersen and Ölander, 2006). However, a number of authors have reported that there is a gap between intentions and action (Davies et al., 2002; Thøgersen, 2004).

This research seeks to model the relationships between the dominant social paradigm, materialistic values, environmental concerns, intentions to behave more responsibly and more environmentally responsible behaviours, using data from consumers in four Asian economies that have strong Confucian and Taoist backgrounds. Given we are exploring the underlying institutional forces, limiting cultural variations is important (Steenkamp, 2001). Asian economies were selected because of the accelerating economic growth within this region (covering over 60 per cent of the world's population) and the increased negative environmental impacts this growing consumption causes (Jenkins, 2002; Martinsons et al., 1997). For example, China now produces more CO₂ emissions than any other country, including the US.

This paper advances our understanding of the underlying causes of environmental behaviour, by examining consumers' views of the underlying institutional forces and levels of materialism. The

research finds that the DSP is positively related to the dimensions of materialism, as was anticipated, but that the DSP is also positively related to environmental concern, which was unexpected. The dimensions of materialism were found to be negatively linked to environmental concern (success was negative and significant, but happiness was negative and insignificant). As was hypothesised, higher levels of concern were positively related to environmental intentions, and intentions lead to positive behaviour (direct and indirect), thus, there was no intention gap within this model for consumers in Asian economies.

Within the paper we first discuss the role of culture in shaping views about the environment. This is followed by a discussion of the literature surrounding the dimensions – DSP, materialism, environmental concern, intentions and behaviours (direct and indirect) – and the associated hypotheses related to relationships tested within the model. We then discuss the methodology and analysis, as well as the implications for theory and practice, along with limitations and avenues for future research.

Conceptual foundation

Culture and the environment

Within this paper, we focus on examining how consumers in four Asian economies view their underlying societal, political and economic foundations (i.e. the dominant social paradigm), materialism, environmental concern, and environmental behaviours. The research examining consumers' knowledge, attitudes and behaviours related to the natural environment has tended to focus on Western economies (e.g. Kilbourne et al., 2009; Fryxell and Lo, 2003). Environmentally focused research has, however, also been undertaken in Asian economies (e.g. Chan et al., 2008) and Asian groups in Western economies (e.g. Deng et al., 2006). While we do not directly compare Western and Asian consumers, it is important to understand how they might differ, especially because of their differing cultural foundations, which shape all types of behaviour, including environmentally focused consumption.

Past examination of Asian cultural values has found that they are generally different from Western values (Bond, 1988; Kim et al., 1999; Sun et al., 2004; Yau, 1988), and that the traditionally recognised set of Western conceptualisations of values does not cover the full scope of values in all societies. For example, Bond (1988) found that some values were unique to Asia or to Western societies, while other values were shared by both. Hofstede and Bond (1988) expanded his cultural framework (Hofstede, 1983) to integrate time horizon (short and long-term) and risk-seeking, which, he suggested, have more relevance in Asian contexts (Xiao and Kim, 2009; Yau, 1988). However, some researchers have found that Asian values are not necessarily very different from those in Western societies (Shafer et al., 2007), and that Asians' values are changing as they become more market focused (Chang et al., 2003; Xiao and Kim, 2009), although traditional Asian values still have a strong impact on behaviour (Le, 2002).

Discourse on the underlying role of religion and the values espoused by religions within society and cultures, including human interaction with the environment and its related consumption (Biel and Nilsson, 2005), have more frequently been examined within the domain of philosophy and religion. But religion is a key dimension of marketing because it shapes consumers' motivations to consume (or not consume), and also forms part of the wider societal norms within which consumers operate.

Western cultural perspectives tend to be grounded in Christian/Judaic religious foundations. They tend to take an anthropocentric view of the world in which there is a belief that non-human nature exists to serve humankind. The anthropocentric view arises directly from the earliest religious teachings. For example, as stated in the Bible:

[...] be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth (Genesis 1:28, italics added).

Asian cultures are based on alternative religious foundations of Confucianism and Taoism. There is extensive debate about what defines religion (Harrison, 2006). One feature of a religion is that it comprises an overarching value and belief system, guiding behaviour. Within Asia, both of Confucianism and Taoism set out such belief systems and these have a similar influence on business and consumer behaviour (Ip, 2009; Le, 2002) within the societies adopting these philosophical approaches, as do the underlying philosophies associated with Christianity and Judaism in Western societies. While Confucianism and Taoism have less organised religious structures than (more formalised) Western religions, these belief systems have been classified and practised as religions in Chinese societies (Taylor and Arbuckle, 1995; Verellen, 1995).

Confucianism posits the need for balance and harmony between nature and human society (Tucker and Berthrong, 1998) and considers the universe as a vast integrated unit rather than as discrete mechanistic parts. Nature is seen as “unified, interconnecting and interpenetrating, consistently relating microcosm and macrocosm” (Tucker and Grim, 1998, p. xxxvi). Taoism also posits the view that man and nature are interconnected (Novak, 1993), where man needs to act “in harmony with tao [italic added]”, that is, nature (Parkes, 1989, p. 81). Thus, in Asian cultures, human activity is viewed as having a direct effect on the natural world and the two are viewed as being interdependent, rather than the Western view where there is an explicit separation or domination of the environment by mankind.

Hence, when examining the interactions between consumers' cultural environment and the physical environment it is important to control for differences in value systems. For example, because of high levels of Hofstede's feminine and collectivism values, consumers in Asian cultures might have a better understanding of the interconnections between people and the environment. It may be that as Asian economies desire to become more developed, they become more Western in values (Bond, 1988; Chang et al., 2003; Ralston et al., 1997; Yau, 1988). While we do not directly compare alternative cultural paradigms, in the following sub-sections we identify instances where such differences might be important.

Dominant social paradigm

One might anticipate that there are macro-institutional structures that are common to all societies, but that societies and consumers would also differ in how they value the dimensions of those structures. That is, different world views, or paradigms, will make different components of behaviour important in different societies, as will the perceived relationships between components. For example, the individual in Western societies is perceived differently than in Eastern societies that tend to be more collectivist, and this might result in differences in managerial and consumer behaviour. In atomistic

societies, the individual is seen as an independent entity without particularly strong ties to communities. In Eastern, more collectivist societies, the relationship to one's community is far more important as is the effect one's behaviour has on the community (Munro, 1985; Ralston et al., 1997). A desire for balance and community would be expected to influence a range of consumer behaviours and attitudes, including one's relationship to nature and whether one considers nature as organic or mechanical (Merchant, 1980). The importance of different aspects of a society's paradigm will eventually converge into a dominant way of thinking and acting within that society. Once a particular paradigm prevails in a society, it becomes their DSP (Pirages and Ehrlich, 1974). The DSP then influences how all other institutional arrangements emerge and how individuals relate to those institutional components.

While the DSP construct and consumers' perception of the DSP has been used in environmental research, it has received limited attention in marketing until recently. In the environmental context, Cotgrove (1982) provided the first comprehensive empirical study of the DSP. Milbrath (1984) followed two years later with a similar study. These two multinational studies examined the relationship between two groups considered to value different aspects of their DSP differently. They concluded that there were individuals who were high or low in terms of their assessment of the DSP, and these assessments were correlated with whether individuals were considered as environmentalists or not. It was suggested that environmentalists tended to be lower on the DSP than those considered to be industrialists.

Dunlap and Van Liere (1984) demonstrated that consumers' assessments of the DSP consisted of economic, technological, and political dimensions, which have also been found in the marketing literature (e.g. Kilbourne et al., 1997; Kilbourne et al., 2002), with Kilbourne et al. (2002) concluding that consumers' assessment of the DSP was related to willingness to consume less and to trade-off economy for ecology in the face of a deteriorating environment. The DSP dimensions are discussed briefly below, but readers should refer to earlier works for more detailed discussion of the complexity of the DSP (e.g. Dunlap and Van Liere, 1984; Kilbourne et al., 1997; Kilbourne, 1998).

The three dimensions of the DSP (economic, political, and technological) have been applied by a range of researchers in environmental contexts (e.g. Nash and Lewis, 2006; Schaefer and Crane, 2005). Generally, researchers have found that consumers' assessment of the dimensions of the DSP is negatively related to individuals' willingness to consume less, willingness to trade economy for ecology, and perceived need for environmental accountability, and it is an obstacle to pro-environmental behaviours (defined in a variety of ways). Given the focus on consumption in developed societies, this may be related to the underlying foundations of Western society in which humans, through their institutions, believe they have the right to use nature indiscriminately to achieve want satisfying goals (i.e. anthropocentric views). This may also shape views of developing societies that are becoming more consumption focused (Ger and Belk, 1996).

Kilbourne (1998) provided a more detailed description of the different dimensions of the DSP by elaborating on the different features contained within each of the dimensions that had been previously established empirically. The political dimension contains institutions relating to possessive individualism, private property, and limited government that were first proposed by Locke (1980). These institutions form the basis for what is now referred to as political liberalism. The constituent elements of the economic dimension can be attributed to Adam Smith (Hirschman, 1977), and consist

of the beliefs that self-interest is the sole motivator of individual behaviour, that allocation of resources through free, competitive markets provides the greatest good for society, and that markets should be powerless and unrestrained. The confluence of political and economic liberalism, now referred to as neoliberalism, has become defined as the sine qua non, of material progress in Western societies (Kassiola, 1990). The outcome of this union of economics and politics is the idea that economic growth is the ultimate good, and that it can only be achieved through these institutions.

During the evolution of liberalism throughout the Enlightenment, technology became equated with material progress (Feenberg, 1991; Winner, 1986), and Western societies have become imbued with a sense of unlimited technological optimism and control (Ehrenfeld, 1978). This results in the prevailing belief that technology provides the solution to society's problems whether they are technical or social. Technology is seen as a positive force under human control, and it provides hope for the future by solving problems that even technology itself creates. It is important to recognise that not all societies hold these beliefs to the same degree. An example of differences is the rejection of genetically modified (GM) foods in many European economies, whereas the USA has been more comfortable in accepting GM products. Those opposed to GM foods see their introduction as a mechanism of further controlling production by big business rather than a mechanism for feeding the masses (Paarlberg, 2001). While most cultures embrace technological optimism, they still have their differences in how they see technology being applied, although there may be other factors that also influence the acceptance or rejection of technological advances, as in the case of GM foods.

Drawing on the past literature, we propose that the consumers' assessment of the DSP contains three basic dimensions – consumers' views of the economic, political, and technological environment. However, we further separate the political dimension conceptually as two separate dimensions both relating to Lockean liberalism, and examine consumers' views of possessive individualism and private property as separate dimensions. It should be reiterated that these are considered to be an integrated system of thought within societies, but weightings allocated to each factor may differ across economies. In some societies, different macro-institutional structures take precedence over others and can vary considerably across cultures. Most developed societies are characterised predominantly as capitalist economic organisations in which private property is highly valued, whereas in Russia, for example, it would be expected, because of their communist history, that private property would be of lesser value. The same would be true of individualism, although this would also be shaped by deeper cultural underpinnings, such as having a collectivist and/or Confucian background, as occurs in many Asian cultures.

Materialism

Materialism is characterised in a number of different ways in research. They include inter alia psychological traits (Belk, 1985), a values orientation (Richins and Dawson, 1992), and as a means of self-identity (Schouten and McAlexander, 1995). Belk (1985) demonstrated that three psychological traits (i.e. possessiveness, non-generosity, and envy) were found among high materialists. He also argued that there is a negative relationship between materialism and happiness in life. Richins and Dawson (1992) support this conclusion in demonstrating that materialism is negatively correlated with overall life satisfaction and self-esteem, even though they approach materialism from a values perspective rather than as a set of psychological traits. Materialism was defined by Richins (1994, p. 522) as “[...] a value that represents the individual's perspective regarding the role possessions should play in his/her life”, and this values perspective is adopted within this research.

Materialism is considered to be the importance that one attaches to material goods in general, which distinguishes it from consumption itself. Consumption, in contrast, relates more directly to the acquisition and use of goods and less to their subjective meaning. In a cross-cultural examination of the relationship between the DSP and materialism, Kilbourne et al. (2009) found that there was a positive relationship. Their study, however, examined the beliefs of university students in Western economies in which the value systems were similar, and Asian values were not considered. Based on these results, we anticipate that the positive correlation between the DSP and materialism will hold for the economies being studied as well. Thus, we hypothesise:

H1. There will be a positive path coefficient between the DSP and the dimensions of materialism.

Environmental concern

Kilbourne and Pickett (2008) demonstrated that materialistic values in the US, as measured with the Richins and Dawson (1992) material values scale, are inversely related to environmental concern. Specifically, as materialistic values increase, expressions of environmental concern decrease. They argue that this is through a process of dissonance reduction because materialistic values are so pervasive in the US that they form an ideological lens through which other behaviours and consequences are filtered. Thus, if one has materialistic values that are central in their life, the knowledge that consumption behaviour leads to negative consequences in the environment creates dissonance that must be resolved. The resolution can be achieved by minimising one's belief that one's behaviour causes environmental problems, which results in one being less concerned about the environment. Consequently, we can expect there to be a negative relationship between materialistic values and environmental concern:

H2. There will be negative path coefficients between the dimensions of materialism and Environmental Concern.

While the model proposed in the present study (see Figure 1) also indicates a relationship between consumers' assessment of the DSP and Environmental Concern, balance theory would suggest that the relationship ought to be negative to achieve cognitive balance, with some related research suggesting that Asian consumers' environmental behaviour is driven by their attitudes more generally (Aoyagi-Usui et al., 2003; Chan and Lau, 2002). However, some research has found consumers in Western economies to be inconsistent in their views, that is, environmental concern does not necessarily shape all types of behaviour, thus, consumers have some internal cognitive dissonance (Thøgersen, 2004). Consumers may, in fact, have imbalanced views that could reflect the conflict between a desire to address environmental concerns and the realisation that their consumption contributes to environmental problems.

Some authors argue that the relationship can be more complex than is usually assumed (Stern, 2000) because the DSP is shaped at the broader cultural level, while personal concern is shaped at the individual level taking into consideration the cultural environment. The further down the causal chain a variable is, the less likely it is that an upstream variable will have a direct, predictable effect. Fransson and Garling (1999), for example, argue that this is one reason behavioural measures are

frequently unrelated to more general measures such as the new environmental paradigm. Other authors suggest that environmental intentions do not necessarily lead to environmental behaviour (Davies et al., 2002; Thøgersen, 2004). We predict a negative relationship because it is consistent with balance theory, although recognising that this might not be the case. However, with increasing knowledge about the relationship between consumption and global warming, the prediction becomes problematic and may cause some internalised conflict that will need to be resolved. This may come about through what is defined as socially responsible consumption (Fisk, 1973) whereby individuals seek to consume, but in a “less harmful” way. From this assessment we believe that:

H3. There will be a negative path coefficient between the DSP and Environmental Concern.

Environmentally-related behaviour

While self-reported environmental behaviours are problematic, it has been demonstrated that as behavioural intentions increase, self-reported behaviours also increase. Stern (2000) argues, however, that some of the inconsistent results can be attributed to the fact that there are different types of environmentally related behaviours, and each type might be subject to different influences, which is consistent with research suggesting people do not adopt all environmental behaviours to the same level (Thøgersen and Ölander, 2003). There are several approaches that can be taken in categorising behaviours, and Stern's suggestion is that direct and indirect behaviours should be considered separately. Direct behaviour refers to those that have a direct impact on the environment. This includes such behaviours as recycling, reusing, and using public transportation. Direct behaviours are such that they reduce environmental damage only in the aggregate, that is, many people must conform to them before there is a positive impact. Indirect behaviours include such things as donating to environmental organisations, writing to political representatives, and boycotting environmental offenders' products. They have no immediate impact on the environment, but a small number of people can have a large impact in some cases. In this study, we consider both direct and indirect self-reported behaviours. The literature suggests that there is a positive correlation between pro-environmental intentions and pro-environmental behaviour (Stern et al., 1995). Because direct and indirect pro-environmental behaviours are closely related, we also suggest that the path from indirect to direct behaviours will be positive. Those who participate in environmental activities are more likely to behave in pro-environmental ways. This provides the following hypotheses:

H5. There will be a positive path coefficient from intentions to indirect environmental behaviours.

H6. There will be a positive path coefficient from intentions to direct environmental behaviours.

H7. There will be a positive path coefficient from indirect to direct behaviours.

This completes the proposed model that is presented in Figure 1. Most of the relationships have been found to hold for consumers in Western economies, thus, we believe that the relationships should also hold for consumers in Asian economies. Broadening geographic coverage is, therefore, important for assessing the generalisability of relationships (Steenkamp and Baumgartner, 1998), although some

such comparisons for individual scales have found that variations exist within the material values scale (Richins and Dawson, 1992; Griffin et al., 2004).

Methodology

Sample

A multi-national sample was taken from four Chinese-speaking Asian economies, China, Taiwan, Hong Kong, and Singapore. Because northern and southern China are socially diverse, half of the Chinese sample came from northern China and half from southern China in an attempt to be representative. The two Chinese sub-samples were merged, as no differences in means were found on any variable. It should also be noted that Hong Kong is considered a special administrative region of China so, technically, it is not a country. We also acknowledge that some consider Taiwan to be an integral part of China. Further, while Singapore is multi-cultural, it has a very strong Chinese cultural foundation (Lee, 1996; Wimalasiri, 1988).

Data were collected using an online survey company (Survey Sampling International- SSI) that maintains omnibus panels in each of the four economies and purports to follow international panel quality standards (Baker et al., 2010). Online panels are increasingly used in academic research (Baker et al., 2010). For example, within academic marketing journals there has been substantial use of online data collection reported in papers appearing since 2005[1] – Web survey (114); Online Survey (529); Internet survey (86); online panel (110).

Online panels are sometimes criticised for not necessarily being representative of the overall population (McDevitt and Small, 2002), which might especially be the case when researching in emerging economies with less sophisticated infrastructure (Craig and Douglas, 2001). However, one would anticipate that even within these countries online panels adequately cover urban, educated, and wealthier respondents, that is, those consumers who can afford and have access to reliable internet services and may also have greater consumption. However, other segments of the population such as low income and rural consumers may not be as effectively covered. In terms of any bias introduced by using an internet data collection process, in meta-analysis comparing web and other survey methods Manfreda et al. (2008) and Shih and Fan (2008) found that response rates were lower online, although online data also had lower non-response error.

Using one data collection process, therefore, allowed us to source a similar set of respondents, that is, people with internet access who have agreed to receive invitations to participate in research on a range of topics. We also explicitly asked the panel providers to seek people who were fluent in Chinese. The final sample consisted of 1,174 respondents, and the demographics of the sample are presented in Table I. We did not try to match samples in terms of demographics, although in all cases the panel provider distributed the invitation to a representative sample from their panel within each economy.

The questionnaires were professionally translated into the appropriate version of Chinese for each economy using standard back-translation protocols. For the Singapore sample, the questionnaire was administered in English, as SSI's panel there was predominantly bilingual, but a screen question assured they were also fluent in Chinese. Questionnaires were distributed online and respondents were paid a fee for completing the twenty-minute questionnaire. The data were then screened for

respondents who completed the questionnaire in less time than was necessary (speeders), as determined in a pre-test of 100 respondents, and for those who had too little variation in their answers (flatliners) determined again in the pre-test. Such pre-tests are important online data quality checks (Baker et al., 2010). There were also four questions embedded in the questionnaire for which the responses would be in the opposite direction for respondents who were seriously considering their responses. Respondents meeting the first two screening criteria who then failed one of these three data quality checks were also eliminated from the final sample. The number of respondents eliminated was approximately 18 per cent and was consistent across the four economies. The final samples were China (364), Hong Kong (260), Taiwan (289), and Singapore (261). Determining response rates when using online surveys is problematic as one does not necessarily know how many people were sent the invitation or completed the survey after starting it (Callegaro and DiSogra, 2008). Given all these factors, we believe they are representative of populations within the countries.

Questionnaire constructs

While the DSP has been used as a reflective construct in the past, the argument might be made that its factors actually define the DSP for an individual. This suggests that it might be characterised as a formative construct as well, and this approach is taken in this research as it also serves to simplify the interpretation of the results. Consequently, the final hypothesised model consisted of one formative and four reflective latent constructs. The individual items making up the constructs are shown in Table II.

The formative construct was the DSP and the four reflective latent constructs measured were consumers' views of two sub-dimensions of materialism (happiness and success), environmental concern, behavioural intentions, and direct and indirect self-reported behaviours. For each reflective construct, the methods for cross-cultural studies proposed by Steenkamp and Baumgartner (1998) and Byrne and Campbell (1999) were followed. As a fit criterion, we used the difference in CFI recommended by Cheung and Rensvold (2002). The procedure entailed separately establishing configural, metric, scalar, variance, and covariance invariance for each of the constructs first. In each case, only partial invariance is required. Because we were developing a nomological net rather than means comparisons, scalar invariance was not required, although we also assessed scalar invariance for completeness. The items and factor loadings for each scale independently are presented in Table II. The results of the invariance tests of the separate reflective constructs are presented in Table III.

Assessment of reflective constructs

Materialism. To measure materialistic values, we used the Richins and Dawson (1992, p. 608) multi-dimensional measure of materialism, the Material Values Scale (MVS). This has been extensively used in the US but its reliability within cross-cultural research has been questioned by Griffin et al. (2004). Thus, we performed both exploratory and confirmatory factor analysis on the scale. The results of the EFA analysis indicated that the three-factor structure (success, centrality, and happiness dimensions) did not hold up in any of the economies, and the coefficient alpha for the Centrality scale did not approach acceptability within any sample. Thus, within our model, we used a two-factor structure with Success and Happiness as the dimensions, as they were consistent across all four samples, although one item in the Happiness scale did not load consistently across economies and was removed. The resulting scale possessed configural, scalar, metric, covariance, and variance invariance using the procedures recommended. Thus, the two dimensions of the materialism scale were

integrated into the model, with four indicators for material success and three indicators for material happiness.

Environmental concern. The items for the environmental concern scale were developed from several studies that used measures of concern. This was a six-item scale using the items presented in Table II that also presents the factor loading for each item. Reliabilities are presented in Table IV. EFA for the scale indicated that a single factor existed for each of the samples. Using CFA it was also determined that the six-item concern scale possessed configural, metric, scalar, and variance invariance. Fit statistics for the results of the invariance tests are in Table III, which suggests that the measure is applicable in all four Asian economies.

Behavioural intentions. The items and their factor loadings are presented in Table II, and reliabilities in Table IV. Because of the difficulty in measuring actual environmental behaviours alone, we chose to measure behavioural intentions as an intermediate variable between environmental concern and behaviours. It has frequently been argued that this is a necessary step in predicting behaviours, and Ajzen and Madden (1986) argue that intentions precede behaviours in causal models. This approach, including environmentally-related behavioural intentions, has been used in other studies as well (Aoyagi-Usui et al., 2003; Chan, 2001), although others have raised some concerns regarding the connection between behavioural intention and actual behaviour (Davies et al., 2002). However, given that much of the literature has suggested that intention is intermediate in causal relationships, we have included it within the model (Ajzen and Fishbein, 1977). The items in the scale incorporated seven different types of intentions related to direct and indirect behaviours. However, the EFA indicated that each of the samples yielded a single factor with only five of the items. The two items eliminated from the scale, contacting political representatives and buying used products, were not highly correlated in any of the samples. The CFA for the five remaining items had a very high fit with configural, metric, scalar, and variance invariance across the samples (see Table III for the statistics). Thus, while Stern (2000) suggested that direct and indirect behaviours should be considered separately, analysis of the behavioural intentions' scale properties suggested that, with regard to intentions at least, one composite construct was most appropriate.

Self-reported behaviour. As indicated earlier, two types of behaviour were analysed. They were categorised as direct and indirect behaviours. Initially, ten different indirect behaviours were used. But the EFA indicated that only six of the behaviours were consistently in one factor across the economies. These six items were maintained in the analysis. Similarly, of the initial ten direct behaviours, only five were in the same factor across samples. Thus, the direct behaviour measure consisted of five items. This refined eleven-item scale was further assessed using CFA. The results of this analysis, shown in Table III, indicated that the behaviour construct was two-dimensional with direct and indirect behaviours representing the dimensions. This supports Stern's (2000) argument that the two types of behaviours are distinct, and applies in the Asian economies as well. Further assessment of the behavioural scale indicated that it possessed configural, metric, partial scalar, variance, and covariance invariance across the economies. Reliabilities for the scale are shown in Table IV.

Thus, all four reflective constructs fit the data independently across countries and possessed configural, metric, scalar, variance, and covariance invariance (where appropriate). In the next phase of the analysis, the formative construct, DSP, was assessed for its appropriateness in the model.

Assessment of formative construct

Dominant social paradigm. The DSP was modelled as a first-order formative construct because the sub-dimensions “Private property,” “Possessive individualism,” “Economic growth,” and “Technological optimism” are assumed to be mutually exclusive types of beliefs that may be correlated, but need not be in order to satisfy the conceptual nature of the construct (Wilson et al., 2011). Rather than using a formative second-order model (for a review, see Diamantopoulos et al., 2008), the above sub-dimensions were quantified by computing the mean of the set of items within each sub-dimension. This method is necessary when undertaking invariance of a formative construct as the literature has, as yet, only investigated invariance of first-order formative measures (Diamantopoulos and Papadopoulos, 2010).

The distinctiveness of formative constructs has been emphasised in the literature, suggesting that conventional methods of construct validity and reliability are not suitable (Bollen, 1989). Hence, reliability in the internal consistency sense and construct validity in terms of discriminant validity are not meaningful for formative constructs (Diamantopoulos and Winklhofer, 2001). Convergent validity for formative constructs is also not relevant. This is because formative construct indicators are, as mentioned previously, not necessarily correlated.

Because the formative construct's empirical assessment on its own is statistically under-identified (Bollen, 1989), we followed the recommendation given by Jarvis et al. (2003) that was adopted in Diamantopoulos and Papadopoulos (2010), whereby two reflective indicators were added to the formative construct. In other words, the model tested was a multiple indicator, multiple cause (MIMIC) model Joreskog and Goldberger (1975). The procedure used involved: testing the metric invariance of the y-variables; estimating a baseline MIMIC model; and testing equality constraints for the γ and ϕ coefficients to be equal in the four different groups. The results of these tests (shown in Table V) indicate that the DSP as a formative construct consisted of four observed variables – political, individualism, economic, and technological.

Structural model

Following the analysis of the separate reflective constructs across countries establishing metric, scalar, covariance and variance invariance, an assessment of the measurement model containing all reflective constructs was completed. The results of this analysis (shown in Table VI) indicate that the model of reflective indicators was consistent across countries and met the standard fit indices.

In the next phase of the analysis, the configural, metric, and scalar invariance were tested across groups and the data were found to possess partial metric and partial scalar invariance, which justifies pooling the data across groups for the final structural equation model. The results of this test are presented in Table VII.

After invariance was established and before running the structural model, we performed a confirmatory factor analysis (CFA) of the pooled model of all the reflective constructs. The CFA model yielded $\chi^2_{(362)}=2131.87$ ($p=0.000$) CFI (Comparative Fit Index)=0.924 TLI (Tucker Lewis Index)=0.914 RMSEA (Root Mean Square Error of Approximation)=0.065 SRMR (Standardised Root Mean Square Residual)=0.053. As indicated by Fornell and Larcker (1981) and Anderson and

Gerbing (1988), convergent validity was assessed by observing the strength in factor loadings and their associated significant t-values (factor loadings should be >0.7), and the Average Variance Explained (AVE; questionable if <0.5) and Composite Reliability (CR; should be >0.7). The above tests are reported in Table VIII.

All the λ coefficients were statistically significant at $p=0.000$ and ranged from a minimum of 0.619 to a maximum of 0.911 (completely standardised) which were deemed satisfactory. Discriminant validity, on the other hand, was assessed by observing that for the six factors, the square root of the AVE must be greater than the correlation coefficients between the model's factors (Fornell and Larcker, 1981). The results of this test are presented in Table IX and indicate that the requirement for discriminant validity was met.

Final structural model

The final phase of the analysis was to examine the full structural model containing both the formative and reflective indicators. This analysis was undertaken and yielded $\chi^2_{(481)}=2877.070$ ($p=0.000$) CFI=0.899 TLI=0.890 RMSEA=0.065 SRMR=0.074, and each of the fit ratios was judged to be satisfactory. To ensure that there was not a country effect on the structural parameters, we also ran a model incorporating country as a control variable by integrating three dummy variables. These additions did not impact on the structural parameter estimates as reported in the model not including the control variables, and thus the re-estimated paths were not deemed to be influenced by country effects. The structural relationships for the model without country control variables and their significances are reported in Figure 2 and Table X.

Discussion

Theoretical implications

The purpose of this paper was to investigate the relationships between the DSP, Materialism, Environmental Concern, Intentions, and Environmental Behaviour, within four Asian economies. The study found that beliefs in these five constructs generally held across all four economies, however, the composition of the constructs varied slightly from those defined in previous Western focused research. For example, the three dimensions of the Material Values Scale (Richins and Dawson, 1992) did not hold in its standard form, and there were only two dimensions across the four Asian economies. The consistency in constructs within the four countries seems to suggest that they are generalisable within Asian economics, which, taken in conjunction with other research, would suggest they apply globally.

The proposed structural model held, although not all the anticipated relationships were found to exist or to follow the predicted directions. The results show that consumers' in Asian economies views of the underlying dominant social paradigm positively affected the dimensions of materialism (i.e. success and happiness). That is, the more someone believed in individualism, private property, economic growth, and technology, the higher were their materialistic values relating to happiness and success. This link does seem to support the view that the changing nature of Asian economies means those consumers are positively disposed to materialistic values (Durvasula and Lysonski, 2010), which is being supported in the changing economic and social institutions.

Kilbourne and Pickett (2008) demonstrated that materialistic values are negatively related to environmental concern and behaviours which is confirmed in this study for success, but not for happiness. These findings are important given the increasing levels of materialism within developing economies (Ger and Belk, 1996) which will mean they may be less willing to give up consumption to protect the environment. This would be consistent with the view that as Asian economies become more Western, Asian values have less impact (Aoyagi-Usui et al., 2003; Chang et al., 2003; Xiao and Kim, 2009). Thus, the spread of consumerism as a measure of success may be an undesirable consequence of globalisation (Levitt, 1983). The fact that happiness is not linked to environmental concern, does suggest that there is some recognition that the environment is important. While governments may be able to regulate behaviour (corporate and consumer), environmental regulation is often less stringent in Asian economies, potentially making it harder to reduce the negative impacts of consumption unless attempts are also made to focus on how not to impede consumers' material success. Targeting changes in outcome behaviours might be less effective than desired if consumers do not change the underlying values on which consumption decisions are made.

We also found that the way the respondents viewed the broader economic system (i.e. the DSP) had a positive impact on consumers' environmental concern. As was previously discussed it was unclear as to whether or not there would be a direct or indirect relationship. Past research has found that this relationship is often negative (Kilbourne et al., 2009), which, taken in conjunction with the relationship between the DSP and materialism, would mean that there is a balanced relationship between these three factors. However, the results suggest that consumers in Asian economies may be in a state of flux, shifting away from the more balanced Asian world perspective (although this is not the case when looking at success). As belief in the DSP increased, environmental concern increased, but so did the level of materialism and the understanding that it lowers environmental concern. That is, consumers operated with some implicit inconsistencies in behaviour (Davies et al., 2002; Thøgersen, 2004; Thøgersen and Ölander, 2003). Thus, there may be internal cultural conflict on the part of consumers in Asian economies when adopting Western focused DSP and materialism values. This could be analogous to the attitude/behaviour gap (Alwitt and Pitts, 1996; Davies et al., 2002; Hansla et al., 2007), suggesting that, while consumers are becoming more concerned about the environment, their behaviour does not reflect their increasing concern. Such an anomaly could be explained by the fact that consumers in Asian economies are aware of the effect their consumption has on the environment, realise they need to change behaviour but are unsure how to do it. And, as a result, they do not act at all. Thus, there are mixed messages, with the DSP and materialism telling them to consume more, and another (quieter voice) telling them to consume less. So, while individuals may still believe in the tenets of the DSP, they may increasingly be aware that their beliefs might be leading to consumption behaviour that degrades the environment. This attitude would be consistent with their cultural foundations indicating that the environment should be valued. Thus, there may still be a lingering connection between underlying Asian cultural foundations that value the natural environment.

The research supports the view that increased environmental concern leads to higher intentions to behave in pro-environmental ways, which is consistent with much of the environmental research (Kilbourne et al., 2009). Polonsky et al. (2012) found that environmental attitudes were more important than other antecedent factors, such as environmental knowledge. Thus, increasing consumers' level of concern would possibly be more impactful in terms of changing their environmental behaviour, which may go some way to explaining the imbalanced results between DSP, materialism, and concern. That is, consumers know that they need to do something, even though the present economic systems do not support such actions.

While some researchers have found there is an intention behaviour gap in terms of environmental behaviour, others have found direct relationships exist (Schlegelmilch et al., 1996). Within this study we found that intentions resulted in both indirect and direct action or behaviour, suggesting the gap is less significant for consumers within Asian economies, and that those consumers appear to act according to their levels of concern. This may, again, relate to the way that nature has been traditionally viewed as being interconnected with the individual in Asian culture.

The overall implication seems to be that concern is a critical component in the model of consumer behaviour in relation to the environment, that is, it shapes people's intentions which, in turn, determine behaviour. The DSP seems to be enhancing consumers' environmental concerns within Asian countries, whereas, in other countries, it has been found to negatively affect environmental concern.

Policy implications

The move to a consumption philosophy seems to be resulting in conflicting signals to consumers. There is a realisation that addressing the environment is important practically as well as culturally, for consumers in Asian economies. There seems to be a direct link between adopting the DSP and environmental concern. While the DSP increases material success, it indirectly influences environmental concern. Thus, the definition of success possibly overemphasises consumption. For example, Polonsky et al. (2012) suggests that we marketers need to focus consumers on want satisfaction, rather than the acquisition of physical goods, so consumers can acquire success without material possessions. This would be a more Asian perspective of how consumers can interact with the world. It might also mean changing the messages portrayed in the DSP, where materialism is not seen as the road to individual well-being.

The research does suggest that if policy-makers are to improve environmental outcomes and consumer behaviour, they do need to ensure that actions enhance consumer concern. However, such a policy does need to be adopted with caution, as past social marketing research identified that raising consumers' concerns too much, through highly emotive appeals, resulted in some consumers turning off to such messages (Hastings et al., 2004). Although seeking to focus solely on informative information was also not effective, some recent research in Western countries suggests that knowledge alone does not necessarily increase attitudes or concern (Polonsky et al., 2012). Given that Asia represents the majority of the world's population, and is experiencing unprecedented economic growth, understanding the underlying factors driving consumers and, thus, the world's environmental problems is imperative.

Limitations

There are some clear limitations in this study, and foremost among them is the sampling method used. Whether the samples were representative of the overall population within economies is problematic. The online consumer panels are restricted to those who have computers, and might result in the samples containing more educated, affluent, and urban consumers than would be found in the general population. Panel owners purport that they are able to draw nationally representative samples from their panels, but the samples are a significant limitation. Further work is needed, therefore, to collect

data on nationally stratified samples that might need to be accessed in alternative ways or through multiple data collection processes (Baker et al., 2010). Potentially, data collection could also be explored by focusing on variations across socio-demographic sub-segments within countries. Even having nationally representative samples could also cause some issues, as there may be regional differences within economies that are not captured. Of course, it may also be that other Asian economies based on different religious values (such as Buddhism, Hinduism or Islam) could have different views, although Buddhism and Hinduism also have a very strong environmental ethos embedded in them. The fact that the Singapore sample completed an English version of the survey rather than a Chinese version may also be a limitation. However, we did seek to include only respondents who spoke Chinese within the sampling frame.

Another limitation of the study is that it was restricted to using correlational methods with their usual limitations. That is, while theory suggests that the DSP and consumers' assessment of DSP are underlying motivators for materialism, it is also possible that material values are a reaction to the DSP. Thus, cause and effect relations cannot be determined. However, this study represents a first step in the global assessment of the DSP, materialism, and the environment in diverse cultures. We did not include data from Western societies, thus, no explicit comparisons could be made, but rather discussion relied on comparisons made within the literature. Future research could further explore potential variations in relationships between Asian economies, even though in our case, the modelling integrating country effects identified that the strength of relationships did not vary between investigated countries. Direct comparisons between Asian and Western economies could also be undertaken rather than inferring differences based on the relationships identified in past literature on Western economies. However, if there are differences within societies (or sub-societies), it may be that relationships (or even construct domains) may differ, as occurred in the determination of the materialism scale, which was only found to comprise two reliable dimensions across the four Asian economies.

Figure I

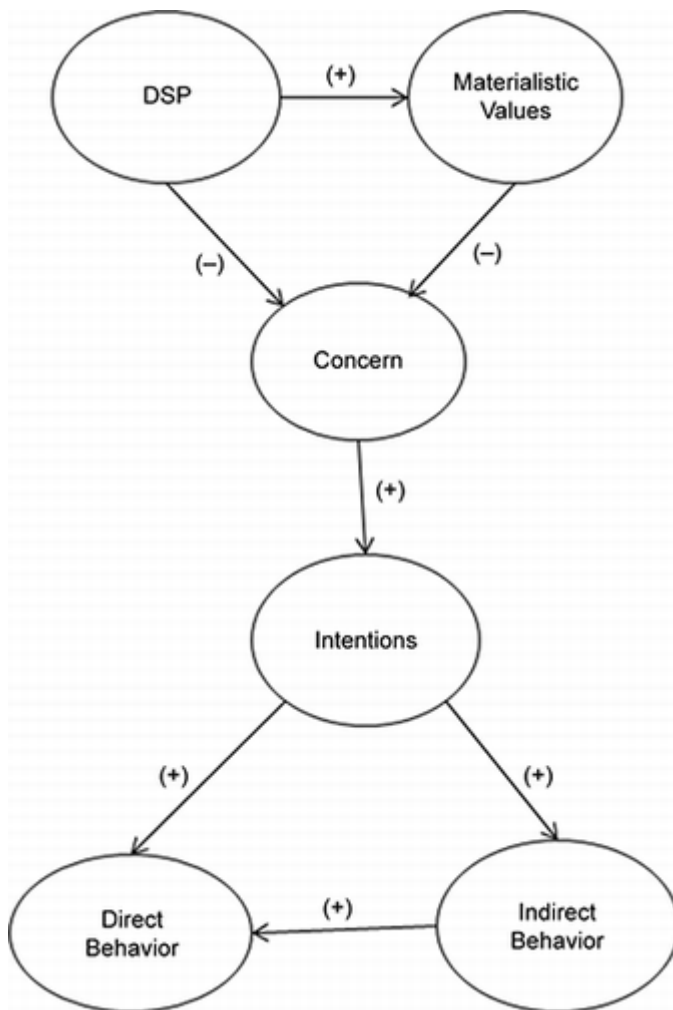
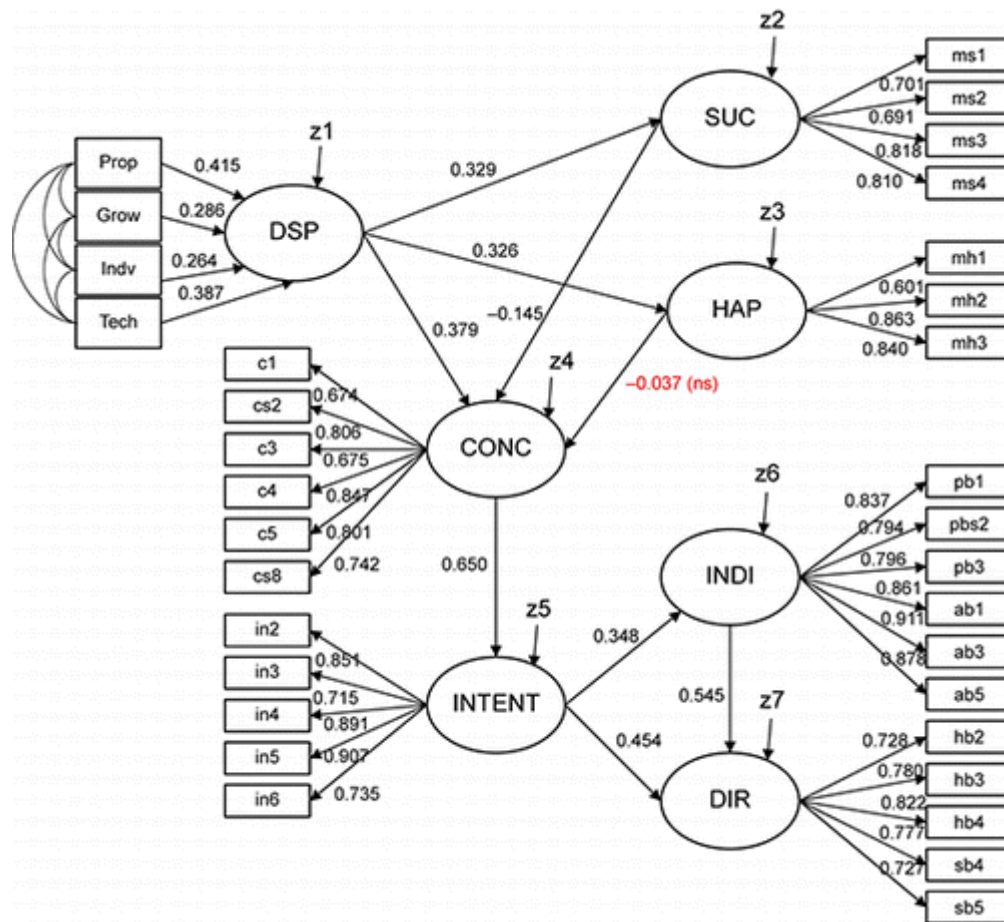


Figure II



Note: All the parameter estimates are completely standardized and significant at $p = 0.000$

Figure III

	Country				Total
	China	Hong Kong	Taiwan	Singapore	
Sex					
Male	0.35	0.79	0.49	0.38	0.49
Female	0.65	0.21	0.51	0.62	0.51
Age					
18-25	0.12	0.21	0.21	0.04	0.14
26-35	0.30	0.33	0.36	0.28	0.32
36-45	0.24	0.30	0.24	0.43	0.30
46-55	0.21	0.12	0.12	0.21	0.17
56-65	0.09	0.03	0.07	0.04	0.06
Over 65	0.03	0.01	0.00	0.00	0.01
Education					
Secondary or less	0.22	0.55	0.17	0.44	0.30
Some university or more	0.88	0.45	0.83	0.56	0.70
Income level					
Lower level	0.40	0.39	0.38	0.23	0.36
Middle level	0.44	0.45	0.52	0.57	0.49
Upper level	0.16	0.16	0.10	0.20	0.15
Marital status					
Married	0.76	0.49	0.46	0.70	0.61
Not married	0.24	0.51	0.54	0.30	0.39

Table I.
Sample demographics^a Note: ^aAll statistics are percentages

Figure IV

Constructs and items	Factor loadings			
	China	Hong Kong	Taiwan	Singapore
Material success				
MS1 - I admire people who own expensive houses, cars and clothes	0.68	0.65	0.73	0.73
MS2 - The things I own say a lot about how well I'm doing in life	0.65	0.76	0.58	0.79
MS3 - I like to own things that impress people	0.62	0.78	0.65	0.65
MS4 - Some of the most important achievements in life include acquiring material possessions	0.73	0.77	0.76	0.68
MS5 - Material possessions signify confidence	0.71	0.67	0.78	0.78
MS6 - I like to keep my life simple so far as possessions are concerned	0.1	0.1	0.1	0.1
MS7 - Having things gives me a lot of pleasure	0.1	0.1	0.1	0.1
MS8 - I pay less emphasis on material things than other people I know	0.1	0.1	0.1	0.1
Material happiness				
MH1 - A possession brings me quite a bit that I can't afford to buy of the things I'd like	0.52	0.65	0.54	0.62
MH2 - My life would be better if I owned certain things I don't have	0.63	0.61	0.63	0.68
MH3 - It's better if I could afford to buy more things	0.65	0.65	0.79	0.68
MH4 - I have all the things I really need to enjoy life	0.1	0.1	0.1	0.1
Technology				
T1 - Advancing technology provides us with hope for the future	0.77	0.67	0.79	0.65
T2 - The good effects of technology outweigh its bad effects	0.57	0.67	0.67	0.73
T3 - Humans are control the bad effects of technology	0.69	0.56	0.49	0.64
T4 - We should have developed better technology	0.69	0.67	0.68	0.69
T5 - Technology has made my life better	0.68	0.69	0.69	0.77
Private property				
PP1 - Individual possessions should be protected as a fundamental freedom	0.71	0.68	0.73	0.73
PP2 - People should be able to use their possessions as they choose	0.71	0.68	0.79	0.65
PP3 - The amount of possessions people have should not be limited	0.69	0.69	0.74	0.76
PP4 - It's alright if some people have much more than others do	0.51	0.44	0.63	0.58
PP5 - The government is responsible for protecting individual possessions	0.67	0.79	0.67	0.64
Individualism				
IND1 - We should limit the government's role in the choices people make	0.67	0.63	0.68	0.67
IND2 - Individual freedom should be the political goal to be achieved in society	0.68	0.69	0.79	0.68
IND3 - People should be allowed to do what they want if it does not affect others	0.69	0.79	0.67	0.69
IND4 - The less people choose to live should we be influenced by the government	0.71	0.74	0.74	0.67
IND5 - The best measure of social progress is political freedom	0.66	0.79	0.63	0.74
Economic growth				
EG1 - If the economy continues to grow, everyone benefits	0.75	0.79	0.74	0.73
EG2 - I prefer a society that tries to increase economic growth	0.90	0.88	0.89	0.87
EG3 - Economic well-being should be the goal of society	0.88	0.88	0.90	0.89
EG4 - The best measure of social progress is economic growth	0.76	0.81	0.76	0.80
EG5 - The primary role of the government should be to increase economic growth	0.79	0.79	0.73	0.79
Environmental concern				
EC1 - I am concerned about the condition of the environment	0.76	0.68	0.68	0.75
EC2 - Business are ruining the environment	0.63	0.69	0.76	0.68
EC3 - I would give up some economic good for a cleaner environment	0.71	0.59	0.68	0.74
EC4 - The condition of the natural environment is getting worse every year	0.63	0.67	0.69	0.63
EC5 - I am concerned about natural resource shortages in the future	0.66	0.76	0.78	0.65
EC6 - We all need to change our behavior to protect the natural environment	0.66	0.76	0.79	0.77
Behavioral intention				
BI1 - I intend to buy environmentally friendly products in the future	0.67	0.64	0.63	0.64
BI2 - I intend to buy more organic food in the future	0.73	0.67	0.74	0.65
BI3 - I intend to reduce household waste in the future	0.69	0.68	0.65	0.67
BI4 - I intend to use products made from recycled material whenever possible	0.69	0.62	0.62	0.69
BI5 - I intend to use more public transportation in the future	0.78	0.79	0.68	0.73
Green behavior				
GB1 - I buy organic foods	0.67	0.79	0.75	0.73
GB2 - I buy and purchase for environmental reasons	0.73	0.63	0.76	0.77
GB3 - I buy products made of recycled material	0.67	0.69	0.76	0.73
GB4 - I pay more for products that cause less environmental harm	0.64	0.68	0.73	0.78
GB5 - I use fewer personal care items for a cleaner environment	0.75	0.61	0.73	0.68
Active behavior				
AB1 - I attend environmental organizations meetings when possible	0.67	0.65	0.69	0.63
AB2 - I contribute money to environmental organizations	0.61	0.69	0.69	0.62
AB3 - I subscribe to environmental magazines	0.63	0.69	0.62	0.75
AB4 - I participate in environmental projects when possible	0.71	0.68	0.76	0.63
AB5 - I participate in environmental groups' activities	0.62	0.71	0.65	0.71
AB6 - I attend local political meetings to support the environment	0.61	0.69	0.69	0.64

Table II.
Construct items and CFA factor loadings

Figure V

Construct	RMSEA	CFI	Δ CFI
<i>Materialism</i>			
Configural	0.032	0.997	
Metric	0.031	0.996	0.001
Scalar	0.044	0.992	0.005
Covariance	0.044	0.991	0.006
Variance	0.044	0.991	0.006
<i>Concern</i>			
Configural		0.077	0.991
Metric	0.067	0.990	0.001
Scalar	0.069	0.986	0.005
Variance	0.068	0.986	0.005
<i>Intentions</i>			
Configural		0.063	0.996
Metric	0.050	0.996	0.000
Scalar	0.063	0.991	0.005
Variance	0.061	0.991	0.005
<i>Behaviors</i>			
Configural	0.058	0.982	
Metric	0.055	0.981	0.001
Scalar	0.065	0.971	0.011 ^a
Covariance	0.052	0.971	0.011
Variance	0.051	0.970	0.012

Table III.
Invariance test of
reflective constructs at
individual level

Note: ^aPartial scalar invariance freeing one intercept

Figure VI

Construct	Measure	China	Hong Kong	Taiwan	Singapore
Success	AVE	0.53	0.60	0.55	0.66
	Reliability	0.82	0.85	0.83	0.88
Happiness	AVE	0.56	0.60	0.53	0.75
	Reliability	0.79	0.82	0.77	0.90
Concern	AVE	0.57	0.57	0.57	0.63
	Reliability	0.89	0.89	0.89	0.91
Intention	AVE	0.69	0.68	0.67	0.64
	Reliability	0.92	0.91	0.91	0.90
Direct	AVE	0.60	0.55	0.54	0.52
	Reliability	0.88	0.86	0.86	0.84
Indirect	AVE	0.70	0.66	0.66	0.64
	Reliability	0.94	0.92	0.92	0.91

Table IV.
Average variance
extracted (AVE) and
construct reliability

Figure VII

	χ^2	df	χ^2	Δ	p-value
Measurement non-invariance	0.540	1			
λ invariance [metric] reflective	7.752	7	6.672	6	0.352
$\lambda + \gamma + \varphi$ invariance of the MIMIC model	18.863	18	18.323	11	0.074

Table V.
Invariance test of the
formative construct

Figure VIII

	n	χ^2 -value	df	p-value	RMSEA	TLI	CFI	SRMR
Together	1,174	3,633.628	1,448	0.000	0.072	0.891	0.902	0.064
China	364	1,027.138	362	0.000	0.071	0.894	0.905	0.060
HK	260	852.151	362	0.000	0.072	0.890	0.902	0.060
THAI	289	943.177	362	0.000	0.075	0.877	0.890	0.071
SING	261	811.162	362	0.000	0.069	0.901	0.912	0.063

Table VI.
Model fit indices overall
and by economy

Figure IX

	χ^2	df	χ^2	Δ	p-value	RMSEA	CAIC	TLI	CFI	CFI Δ	
Configural invariance	3,634	1,448			0.000	0.072	93,858.305	0.891	0.902	0.000	Supported
Full metric invariance	3,775	1,517	142	69	0.000	0.071	93,862.765	0.892	0.899	0.003	Rejected
Partial metric invariance	3,095	1,500	62	52	0.165	0.071	93,816.126	0.894	0.902	0.000	Supported
Scalar invariance	4,180	1,553	547	105	0.000	0.076	94,194.845	0.877	0.883	0.019	Rejected
Partial scalar invariance	3,814	1,538	180	90	0.000	0.071	93,842.510	0.893	0.899	0.003	Supported

Table VII.
Invariance test of the reflective constructs all together – one single CFA model

Figure X

	λ 's	SE	t-value	p-value	CR	AVE
SUC					0.842	0.573
MS1	0.716	0.017	410.827	0.000		
MS2	0.672	0.019	360.021	0.000		
MS3	0.819	0.013	610.016	0.000		
MS4	0.811	0.014	590.338	0.000		
HAP					0.819	0.605
MH1	0.619	0.021	29.838	0.000		
MH2	0.843	0.014	62.459	0.000		
MH3	0.850	0.013	63.621	0.000		
CONC					0.891	0.579
C1	0.665	0.018	36.588	0.000		
C2	0.811	0.012	67.340	0.000		
C3	0.672	0.018	37.682	0.000		
C4	0.854	0.010	82.728	0.000		
C5	0.804	0.012	65.447	0.000		
C5	0.740	0.015	49.264	0.000		
INTN					0.913	0.678
IN1	0.851	0.009	90.058	0.000		
IN2	0.715	0.015	46.161	0.000		
IN3	0.891	0.008	118.754	0.000		
IN4	0.907	0.007	131.514	0.000		
IN5	0.735	0.015	50.567	0.000		
INDR					0.938	0.718
IB1	0.837	0.010	84.621	0.000		
IB2	0.794	0.012	66.796	0.000		
IB3	0.796	0.012	68.047	0.000		
IB4	0.862	0.009	100.520	0.000		
IB5	0.911	0.006	144.377	0.000		
IB6	0.878	0.008	112.497	0.000		
DIR					0.907	0.620
DB1	0.727	0.016	46.088	0.000		
DB2	0.781	0.014	57.664	0.000		
DB3	0.820	0.012	68.494	0.000		
DB4	0.778	0.014	55.919	0.000		
DB5	0.730	0.016	45.841	0.000		

Table VIII.
Analysis of convergent validity

Figure XI

	SUC	HAP	CONC	INTN	INDR	DIR
SUC	<i>0.757</i> -					
HAP	0.664 (30.263)	<i>0.778</i> -				
CONC	-0.041 (-1.228) ^a	0.007 (0.212) ^a	<i>0.761</i> -			
INTN	-0.029 (-0.879) ^a	-0.024 (-0.732) ^a	0.643 (31.964)	<i>0.823</i> -		
INDR	0.096 (2.96)	0.057 (1.766) ^a	0.179 (5.795)	0.352 (12.729)	<i>0.847</i> -	
DIR	-0.014 (-0.429) ^a	-0.053 (-1.562) ^a	0.393 (13.741)	0.646 (31.816)	0.703 (39.501)	<i>0.787</i> -

Notes: Completely standardized coefficients. The diagonal cells in italic exhibit the square root of average variance extracted, while the *t*-values are reported in parenthesis. ^aParameter estimate is non-significant at $p = 0.05$

Table IX. Analysis of discriminant validity

Figure XII

	Parameter estimate	SE	<i>t</i> -value	<i>p</i> -value	Hypothesis confirmed
DSP → SUC	0.329	0.029	11.393	0.000	Y
DSP → HAP	0.326	0.029	11.351	0.000	Y
DSP → CONC	0.379	0.031	12.351	0.000	Y
SUC → CONC	-0.145	0.039	-3.712	0.000	Y
HAP → CONC	-0.037	0.039	-0.948	0.343	N
CONC → INTN	0.650	0.020	32.806	0.000	Y
INTN → INDI	0.348	0.028	12.608	0.000	Y
INDI → DIR	0.545	0.021	26.126	0.000	Y
INTN → DIR	0.454	0.022	20.810	0.000	Y

Table X. Structural parameters and hypothesis testing

Note: Parameter estimates are completely standardized

References

1. Ajzen, I. and Fishbein, M.A. (1977), "Attitude-behavior relations: a theoretical analysis and review of empirical research", *Psychological Bulletin*, Vol. 84, pp. 888-918.
2. Ajzen, I. and Madden, T.J. (1986), "Prediction of goal-directed behavior: attitudes, intentions, and perceived behavioral control", *Journal of Experimental Social Psychology*, Vol. 22 No. 5, pp. 453-474.
3. Alwitt, L.F. and Pitts, R.E. (1996), "Predicting purchase intentions for an environmentally sensitive product", *Journal of Consumer Psychology*, Vol. 5 No. 1, pp. 49-64.
4. Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, pp. 411-423.
5. Aoyagi-Usui, M. , Vinken, H. and Kuribayashi, A. (2003), "Pro-environmental attitudes and behaviors: an international comparison", *Human Ecology Review*, Vol. 10 No. 1, pp. 23-31.
6. Baker, R. , Blumberg, S. , Brick, J.M. , Couper, M.P. , Courtright, M. , Dennis, M. , Dillman, D. , Frankel, M.R. , Garland, P. , Groves, R.M. , Kennedy, C. , Krosnick, J.A. , Lee, D. , Lavrakas, P.J. , Link, M. , Piekarski, L. , Rao, K. , Thomas, R.K. and Zahs, D. (2010), "Research synthesis: AAPOR report on online panels", *Public Opinion Quarterly*, Vol. 74 No. 4, pp. 711-778.
7. Belk, R.W. (1985), "Materialism: trait aspects of living in the material world", *Journal of Consumer Research*, Vol. 12, December, pp. 265-280.
8. Biel, A. and Nilsson, A. (2005), "Religious values and environmental concern: harmony and detachment", *Social Science Quarterly*, Vol. 86 No. 1, pp. 178-191.
9. Bollen, K. (1989), *Structural Equations with Latent Variables*, John Wiley & Sons, New York, NY.
10. Bond, M.H. (1988), "Finding universal dimensions of individual variation in multicultural studies of values: the rokeach and Chinese values surveys", *Journal of Personality and Social Psychology*, Vol. 55 No. 6, pp. 1009-1015.
11. Byrne, B.M. and Campbell, T.L. (1999), "Cross-cultural comparisons and the assumption of equivalent measurement and theoretical structure: a look beneath the surface", *Journal of Cross-Cultural Psychology*, Vol. 30 No. 5, pp. 555-574.

12. Callegaro, M. and DiSogra, C. (2008), "Computing response metrics for online panels", *Public Opinion Quarterly*, Vol. 72 No. 5, pp. 1008-1032.

13. Chan, R.Y. (2001), "Determinants of Chinese consumers' green purchase behavior", *Psychology & Marketing*, Vol. 18 No. 4, pp. 389-413.

14. Chan, R.Y.K. and Lau, L.B.Y. (2002), "Explaining green purchasing behavior: a cross-cultural study on American and Chinese consumers", *Journal of International Consumer Marketing*, Vol. 14 Nos 2/3, pp. 9-40.

15. Chan, R.Y.K. , Wong, Y.H. and Leung, T.K.P. (2008), "Applying ethical concepts to the study of 'green' consumer behavior: an analysis of Chinese consumers' intentions to bring their own shopping bags", *Journal of Business Ethics*, Vol. 79 No. 4, pp. 469-481.

16. Chang, W.C. , Wong, W.K. and Koh, J.B.K. (2003), "Chinese values in Singapore: traditional and modern", *Asian Journal of Social Psychology*, Vol. 6 No. 1, pp. 5-29.

17. Cheung, G.W. and Rensvold, R.B. (2002), "Evaluating goodness-of-fit indexes for testing measurement invariance", *Structural Equation Modeling*, Vol. 9, pp. 233-255.

18. Cotgrove, S. (1982), *Catastrophe or Cornucopia?: The Environment, Politics, and the Future*, Wiley, New York, NY.

19. Craig, C.S. and Douglas, S.P. (2001), "Conducting international marketing research in the twenty-first century", *International Marketing Review*, Vol. 18 No. 1, pp. 80-90.

20. Davies, J. , Foxall, G.R. and Pallister, J. (2002), "Beyond the intention-behaviour mythology: an integrated model of recycling", *Marketing Theory*, Vol. 2 No. 1, pp. 29-113.

21. Deng, J. , Walker, G.J. and Swinnerton, G. (2006), "A comparison of environmental values and attitudes between Chinese in Canada and Anglo-Canadians", *Environment and Behavior*, Vol. 38 No. 1, pp. 22-47.

22. Diamantopoulos, A. and Papadopoulos, N. (2010), "Assessing the cross-national invariance of formative measures: guidelines for international business researchers", *Journal of International Business Studies*, Vol. 41 No. 2, pp. 360-370.

23. Diamantopoulos, A. and Winklhofer, H.M. (2001), "Index construction with formative indicators: an alternative to scale development", *Journal of Marketing Research*, Vol. 38 No. 2, pp. 269-277.
24. Diamantopoulos, A. , Riefler, P. and Roth, K.P. (2008), "Advancing formative measurement models", *Journal of Business Research*, Vol. 61 No. 12, pp. 1203-1218.
25. Dunlap, R.E. and Van Liere, K.D. (1984), "Commitment to the dominant social paradigm and concern for environmental quality", *Social Science Quarterly*, Vol. 65 No. 4, pp. 1013-1028.
26. Durvasula, S. and Lysonski, S. (2010), "Money, money, money – how do attitudes toward money impact vanity and materialism? The case of young Chinese consumers", *Journal of Consumer Marketing*, Vol. 27 No. 2, pp. 169-179.
27. Ehrenfeld, D. (1978), *The Arrogance of Humanism*, Oxford University Press, New York, NY.
28. Feenberg, A. (1991), *Critical Theory of Technology*, Oxford University Press, Oxford.
29. Fisk, G. (1973), "Criteria for a theory of responsible consumption", *Journal of Marketing*, Vol. 37 No. 1, pp. 24-31.
30. Fornell, C. and Larcker, D.F. (1981), "Structural equation models with unobservable variables and measurement error: algebra and statistics", *Journal of Marketing Research*, Vol. 18 No. 3, pp. 382-388.
31. Fransson, N. and Garling, T. (1999), "Environmental concern: conceptual definitions, measurement methods, and research findings", *Journal of Environmental Psychology*, Vol. 19 No. 4, pp. 369-382.
32. Fryxell, G.E. and Lo, C.W. (2003), "The influence of environmental knowledge and values on managerial behaviours on behalf of the environment: an empirical examination of managers in china", *Journal of Business Ethics*, Vol. 46 No. 1, pp. 45-69.
33. Ger, G. and Belk, R.W. (1996), "Cross-cultural differences in materialism", *Journal of Economic Psychology*, Vol. 17 No. 1, pp. 55-77.

34. Griffin, M. , Babin, B.J. and Christensen, F. (2004), "A cross-cultural investigation of the materialism construct assessing the Richins and Dawson's materialism scale in Denmark, France and Russia", *Journal of Business Research*, Vol. 57 No. 8, pp. 893-900.

35. Haller, M. and Hadler, M. (2006), "How social relations and structures can produce happiness and unhappiness: an international comparative analysis", *Social Indicators Research*, Vol. 75 No. 2, pp. 169-216.

36. Hansla, A. , Gamble, A. , Juliusson, A. and Garling, T. (2007), "Psychological determinants of attitude towards and willingness to pay for green electricity", *Energy Policy*, Vol. 36 No. 2, pp. 768-774.

37. Harrison, V.S. (2006), "The pragmatics of defining religion in a multi-cultural world", *International Journal for Philosophy of Religion*, Vol. 59 No. 3, pp. 133-152.

38. Hastings, G. , Stead, M. and Webb, J. (2004), "Fear appeals in social marketing: strategic and ethical reasons for concern", *Psychology and Marketing*, Vol. 21 No. 11, pp. 961-986.

39. Hirschman, A.O. (1977), *The Passions and the Interests: Political Arguments for Capitalism Before its Triumph*, Princeton University Press, Princeton, NJ.

40. Hofstede, G. (1983), "The cultural relativity of organizational practices and theories", *Journal of International Business Studies*, pp. 75-89.

41. Hofstede, G. and Bond, M. (1988), "The Confucius Connection: from cultural roots to economic growth", *Organisational Dynamics*, Vol. 16, pp. 5-21.

42. Ip, P.K. (2009), "Is Confucianism good for business ethics in China?", *Journal of Business Ethics*, Vol. 88 No. 3, pp. 463-476.

43. Jarvis, C.B. , MacKenzie, S.B. and Podsakoff, P.A. (2003), "A critical review of construct indicators and measurement model misspecification in marketing and consumer research", *Journal of Consumer Research*, Vol. 30, pp. 199-216.

44. Jenkins, T.N. (2002), "Chinese traditional thought and practice: lessons for an ecological economics worldview", *Ecological Economics*, Vol. 40, pp. 39-52.

45. Joreskog, K. and Goldberger, A. (1975), "Estimation of a model with multiple indicators and multiple causes of a single latent variable", *Journal of American Statistical Association*, Vol. 70, pp. 631-639.
46. Kassiola, J. (1990), *The Death of Industrial Civilization*, State University of New York Press, Albany, NY.
47. Kilbourne, W.E. (1998), "Green marketing: a theoretical perspective", *Journal of Marketing Management*, Vol. 14 No. 6, pp. 641-655.
48. Kilbourne, W.E. and Beckmann, S.C. (1998), "Review and critical assessment of research on marketing and the environment", *Journal of Marketing Management*, Vol. 14 No. 6, pp. 513-532.
49. Kilbourne, W.E. and Pickett, G. (2008), "How materialism affects environmental beliefs, concern, and environmentally responsible behavior", *Journal of Business Research*, Vol. 61 No. 10, pp. 1-9.
50. Kilbourne, W.E. , Beckmann, S.C. and Thelen, E. (2002), "The role of the dominant social paradigm in environmental attitudes: a multi-national examination", *Journal of Business Research*, Vol. 55 No. 3, pp. 193-204.
51. Kilbourne, W. , McDonagh, P. and Prothero, A. (1997), "Sustainable consumption and the quality of life: a macromarketing challenge to the dominant social paradigm", *Journal of Macromarketing*, Vol. 17 No. 1, pp. 4-24.
52. Kilbourne, W.E. , Dorsch, M. , McDonagh, P. , Urien, B. , Prothero, A. , Grünhagen, M. , Polonsky, M.J. , Marshall, D. , Foley, J. and Bradshaw, A. (2009), "The institutional foundations of materialism in Western societies: a conceptualization and empirical test", *Journal of Macromarketing*, Vol. 29 No. 3, pp. 259-278.
53. Kim, B.K. , Atkinson, D.R. and Yang, P.H. (1999), "The Asian values scale: development, factor analysis, validation, and reliability", *Journal of Counseling Psychology*, Vol. 46 No. 3, pp. 342-352.
54. Le, L. (2002), "Influences of confucianism on the market economy of China", in Alom, I. (Ed.), *Chinese Culture, Organizational Behavior, and International Business Management*, Prager Publishers, Westport, CT, pp. 27-39.

55. Lee, J. (1996), "Culture and Chinese management – a study of small Chinese family business in Singapore", *Journal of Small Business Management*, Vol. 34 No. 3, pp. 63-67.

56. Levitt, T. (1983), "Globalization and markets", *Harvard Business Review*, Vol. 61, pp. 39-49.

57. Locke, J. (1980), *Second Treatise of Government*, Hackett Publishing Company, Cambridge, MA.

58. McDevitt, P.K. and Small, M.H. (2002), "Proprietary market research: are online panels appropriate?", *Marketing Intelligence & Planning*, Vol. 20 Nos 4/5, pp. 285-296.

59. Manfreda, K.L. , Bosnjak, M. , Berzelak, J. , Haas, I. and Vehovar, V. (2008), "Web surveys versus other survey modes: a meta-analysis comparing response rates", *International Journal of Marketing Research*, Vol. 50 No. 1, pp. 70-104.

60. Martinsons, M.G. , Simon, K.S. , Tin, C. and Wong, D. (1997), "Hong Kong and China: emerging markets for environmental products and technologies", *Long Range Planning*, Vol. 30 No. 2, pp. 277-290.

61. Merchant, C. (1980), *The Death of Nature: Women, Ecology and the Scientific Revolution*, Wildwood House, London.

62. Milbrath, L. (1984), *Environmentalists: Vanguard for a New Society*, University of New York Press, Albany, NY.

63. Munro, D. (ed) (1985), *Individualism and holism: Studies in Confucian and Taoist values*, Center for Chinese Studies, University of Michigan, Ann Arbor, MI.

64. Nash, N. and Lewis, A. (2006), "Overcoming obstacles to ecological citizenship: the dominant social paradigm and local environmentalism", in Dobson, A. and Bell, D. (Eds), *Environmental Citizenship*, MIT Press, Cambridge, MA, pp. 153-184.

65. Novak, P. (1993), "Tao how? Asian religions and the problem of environmental degradation", *ReVision*, Vol. 16 No. 2, pp. 77-82.

66. Paarlberg, R.L. (2001), *The Politics of Precaution: Genetically Modified Crops in Developing Countries*, Johns Hopkins University Press, Baltimore, MD.

67. Parkes, G. (1989), "Human/nature in Nietzsche and Taoism in nature", in Callicott, B. and Ames, R.T. (Eds), *Asian Traditions of Thought: Essays in Environmental Philosophy*, State University of New York Press, Albany, NY.
68. Pirages, D.C. and Ehrlich, P.R. (1974), *Ark II: Social Response to Environmental Imperatives*, Freeman, San Francisco, CA.
69. Polonsky, M.J. , Vocino, A. , Landreth Grau, S. and Ferdous, A.S. (2012), "The impact of general and carbon related environmental knowledge on US consumers", *Journal of Marketing Management*, Vol. 28 Nos 3-4, pp. 238-263.
70. Ralston, D.A. , Holt, D.H. , Terpstra, R.H. and Yu, K.C. (1997), "The impact of national culture and economic ideology on managerial work values: a study of the United States, Russia, Japan, and China", *Journal of International Business Studies*, Vol. 28 No. 1, pp. 177-207.
71. Richins, M.L. (1994), "Special possessions and the expression of material values", *Journal of Consumer Research*, Vol. 21 No. 3, pp. 522-533.
72. Richins, M.L. and Dawson, S. (1992), "A consumer values orientation for materialism and its measurement: scale development and validation", *Journal of Consumer Research*, Vol. 19, pp. 303-316.
73. Schaefer, A. and Crane, A. (2005), "Addressing sustainability and consumption", *Journal of Macromarketing*, Vol. 25 No. 1, pp. 76-92.
74. Schlegelmilch, B.B. , Bohlen, G.M. and Diamantopoulos, A. (1996), "The link between green purchase decisions and measures of environmental consciousness", *European Journal of Marketing*, Vol. 30, pp. 35-55.
75. Schouten, J.W. and McAlexander, J.H. (1995), "Subcultures of consumption: an ethnography of the new bikers", *Journal of Consumer Research*, Vol. 22, pp. 43-61.
76. Schultz, P.W. , Gouveia, V.V. , Cameron, L.D. , Tankha, G. , Schmuck, P. and Franek, M. (2005), "Values and their relationship to environmental concern and conservation behavior", *Journal of Cross-Cultural Psychology*, Vol. 36 No. 4, pp. 457-475.

77. Shafer, W.E. , Fukukawa, K. and Lee, G.M. (2007), "Values and the perceived importance of ethics and social responsibility: the US versus China", *Journal of Business Ethics*, Vol. 70 No. 3, pp. 265-284.
78. Shih, T.H. and Fan, X. (2008), "Comparing response rates from web and mail surveys: a meta-analysis", *Field Methods*, Vol. 20 No. 3, pp. 249-271.
79. Steenkamp, J.B.E.M. (2001), "The role of national culture in international marketing research", *International Marketing Review*, Vol. 18 No. 1, pp. 30-44.
80. Steenkamp, J.B.E.M. and Baumgartner, H. (1998), "Assessing measurement invariance in cross-national research", *Journal of Consumer Research*, Vol. 25, pp. 78-90.
81. Stern, P.C. (2000), "Toward a coherent theory of environmentally significant behavior", *Journal of Social Issues*, Vol. 56 No. 3, pp. 407-424.
82. Stern, P.C. , Dietz, T. , Kaloff, L. and Guagnano, G.A. (1995), "Values, beliefs, and pro-environmental action: attitude formation toward emergent attitude objects", *Journal of Applied Social Psychology*, Vol. 25 No. 18, pp. 1611-1636.
83. Sun, T. , Horn, M. and Merritt, D. (2004), "Values and lifestyles of individualists and collectivists: a study on Chinese, Japanese, British and US consumers", *Journal of Consumer Marketing*, Vol. 21 No. 5, pp. 318-331.
84. Taylor, R. and Arbuckle, G. (1995), "Confucianism", *The Journal of Asian Studies*, Vol. 54 No. 2, pp. 347-354.
85. Thøgersen, J. (2004), "A cognitive dissonance interpretation of consistencies and inconsistencies in environmentally-responsible behavior", *Journal of Environmental Psychology*, Vol. 24, pp. 93-103.
86. Thøgersen, J. and Ölander, F. (2003), "Spillover of environment-friendly consumer behaviour", *Journal of Environmental Psychology*, Vol. 23 No. 3, pp. 225-236.
87. Thøgersen, J. and Ölander, F. (2006), "To what degree are environmentally-beneficial choices reflective of a general conservation stance?", *Environment and Behavior*, Vol. 38, pp. 550-569.

88. Tucker, M.E. and Berthrong, J. (1998), "Introduction setting the context", in Tucker, M.E. and Berthrong, J. (Eds), *Confucianism and Ecology: The Interrelation of Heaven, Earth and Humans*, Harvard University Press, Cambridge, MA.

89.

Tucker, M.E. and Grim, J. (1998), "Series forward", in Tucker, M.E. and Berthrong, J. (Eds), *Confucianism and Ecology: The Interrelation of Heaven, Earth and Humans*, Harvard University Press, Cambridge, MA.

90. Verellen, F. (1995), "Taoism", *The Journal of Asian Studies*, Vol. 54 No. 2, pp. 322-346.

91. Wang, J. and Wallendorf, M. (2006), "Materialism, status signaling, and product satisfaction", *Journal of the Academy of Marketing Science*, Vol. 34 No. 4, pp. 494-505.

92. Wilson, B. , Vocino, A. , Adam, S. and Stella, J. (2011), "Investigating directionality for a media consumption construct: establishing the utility of confirmatory vanishing tetrad analysis", *Asia Pacific Journal of Marketing and Logistics*, Vol. 23 No. 1, pp. 23-38.

93. Wimalasiri, J. (1988), "Cultural influence on management aspects: the experience of the Chinese in Singapore", *Asia Pacific Journal of Management*, Vol. 5 No. 3, pp. 180-196.

94. Winner, L. (1986), *The Whale and the Reactor: A Search For Limits in an Age of High Technology*, University of Chicago Press, Chicago, IL.

95. Xiao, G. and Kim, J.O. (2009), "The investigation of Chinese consumer values, consumption values, life satisfaction and consumption behaviours", *Psychology & Marketing*, Vol. 26 No. 7, pp. 610-624.

96. Yau, O.H.M. (1988), "Chinese cultural values: their dimensions and marketing implications", *European Journal of Marketing*, Vol. 22 No. 5, pp. 44-57.

Further Reading

1. Chen, F.F. , Sousa, K.H. and West, S.G. (2005), "Testing measurement invariance of second-order factor models", *Structural Equation Modeling*, Vol. 12 No. 3, pp. 471-492.

2. Richins, M.L. (2004), "The material values scale: measurement properties and development of a short form", *Journal of Consumer Research*, Vol. 31 No. 1, pp. 209-219.

Notes

Marketing journals are defined as journals with the word marketing in the title. The key terms were assessed in Google Scholar May 2012.

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