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Green Value Chain: A Case Study in Turkey about the Relationships among Antecedents, Initiatives and Results of Green Value Chain Implementations

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Abstract: The present study was conducted to determine the green value chain implementations of large and medium size businesses and to investigate the relationships among antecedents, initiatives and results of green value chain implementations. The antecedents of green value chain implementations were considered from four dimensions namely regulations, public concerns, expected competitive advantage and top management commitment; green value chain initiatives were considered from three dimensions namely green primary activities, green internal support activities and green external support activities; the results of green value chain implementations were considered from two dimensions namely economic performance and socio-ecologic performance. A model was created according to the objectives of the study and hypotheses were formed. Multiple regression analyses were performed to investigate the relationships between the antecedents and initiatives of green value chain implementations. A relationship was not observed between green primary activities and economic and socio-ecologic performance. While a positive relationship was observed between green external support activities and economic performance, a positive relationship was observed between green internal support activities and both economic and socio-ecologic performance

Key words: Green value chain, green primary activities, green internal support activities, green external support activities, economic performance, socio-ecologic performance.

1. Introduction

Environmental disasters and the problems experienced by individuals and societies have raised environmental awareness among them. Businesses are largely responsible for environmental pollution and they have been forced to act in a conscious fashion towards the environment with the implementation of legal regulations. Environmental awareness and environmental management activities along with this awareness include highly beneficial, but difficult to achieve, activities. These practices are also expressed as environmental management implementations and are implemented through a wide range of activities from raw material supply to the disposal of products (purchase, production, marketing, waste management …). Herein, businesses use techniques that can guide them in environmental protection issues like the green value chain. Green value chain implementations express the value added created to form a competitive advantage through various stages from the design of the products to after-sale services. Together with the strategic importance of value creation, entire activities herein focus on environmental impacts, prevention or minimization of environmental pollution, environmental protection and even proactive regulations.

It was reported in the literature that environmentally conscious activities had significant impacts on the performance of businesses (1-5). Increased performances were observed with increasing environmental awareness levels. Performance can be evaluated under different headings such as economic,

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financial, ecologic, socio-ecologic, operational and social. Increases in quality, efficiency, productivity, sales and profit margins, cost savings, new market opportunities or increases in market shares are all considered under either economic or financial performance. A decrease in environmental complaints about products, decreases in waste and emissions, an increase in recycling activities, improved business image and social attachment are considered under socio-ecologic performance. In this context, a positive relationship may be assumed between green value chain implementations and the economic, socio-ecologic performance of businesses. Moving from this point forward, the objectives of the present study were set as to determine the green value chain implementations of businesses and to investigate the relationships among the antecedents, initiatives and results of green value chain implementations. Initially, the concept of the green value chain will be described, the antecedents of green value chain implementations and possible outcomes will briefly be explained and finally the results from the developed model will be presented.

2. **Materials**

2.1. Green Value Chain

The concept "Value Chain" was first proposed by Porter (1985) as the combined evaluation of nine general activities creating a value for the competitive advantage of businesses (6). Beside this, Handfield et al. (1997) defined the value chain as follows: combined evaluation of different factors along the life cycle of a product like design, supply, logistics, installation, production, marketing, sale and after sale service (7). The green value chain on the other hand, just adds a new dimension namely the "environment" to the traditional value chain (8). The green value chain expresses the appraisal of the value creating activities of a business by also taking natural resources and the environment into consideration with in a holistic and sustainable perspective. It is also used as a tool to put the strong and weak points of business activities through ecological evaluations. Such a tool evaluates the business as a whole, does not limit itself only to popular issues like marketing and advertising but also takes environmental consciousness into consideration (9).

In the literature, green value chain implementations are evaluated from different perspectives. Among these perspectives, the most widely accepted approach is that developed by using the value chain analysis of Porter (1985) and primary and auxiliary activities (10, 11). Solvang et al. (2006) evaluated green value chain implementations within the framework of waste reduction approaches throughout the process from suppliers to consumers. Sitkin (2011) evaluated green value chain functions under upstream (sourcing and production) and downstream (packaging and logistics) activities (12). Table 1 summarizes green value chain implementations as primary and supportive activities (internal and external support).

Table 1 Green Value Chain

Internal support activities	Primary activities				External support activities	Economic conditions
	Green operations	Green logistics	Green mark. and sales	Green services		
Green infrastructure development	Recyclable packaging	Transport impacts, transportation and storage modes	Raw materials, supply	Receipt and environmental disposal of used products		
Green technology	Pollution	Waste management,	Packaging	Restorations and		Non-Govern-

	minimization and control, energy efficiency	alternative energy sources	reduction	improvements		mental Organizations
Green human resource management	Corporate environmental awareness, corporate culture, training programs	Contracts, supplier selection, staff selection	Internal and external communication, community liaison	Incentives, rewards for green ideas and practices		State
Green regulations, management systems	"Just-in-time" processes	Recyclability	Green product development, green product supply	Environmental standards		Goverment policies

Source: Adapted from M. Saha, G. Darnton, Green companies or green con-panies: Are companies really green, or are they pretenting to be? Business and Society Review 110 (2) (2005) 125 and N.O. Ndubisi, S.R. Nair, W.J. Johnton, GE (green entrepreneurship) and GVA (green value added): A conceptual framework, International Journal of Entrepreneurship 13 Special Issue (2009) 25.

2.1.1. Primary Activities

The primary activities of green value chain implementations are considered under four dimensions, namely green logistic, green operations, green marketing-sales and green services. These dimensions are described separately below.

Gree*n Logistics:* Logistic activities are considered in two parts as inbound and outbound. Inbound logistics are responsible for receiving the materials from the suppliers and storing them until they are ready for use. Eco-efficiency can be achieved in all related activities like transportation, martial handling, storage and warehousing (11). Outbound logistics are concerned with customer requirements and finished goods (13). Logistic activities including the supply, transport, storage and distribution of finished goods are evaluated with regard to environmental impacts in the green value chain and an attempt is made to ensure that all the processes are realized by taking environmentally friendly goods and ecologic productivity into consideration.

Green Operations: Businesses take inputs, pass them through a conversion process and create a value. During these processes, businesses should be environmentally conscious and should take environmentally friendly actions in the purchase, design, technology, waste disposal and energy use of all business activities. Businesses tend to strategic environmental management while performing such environmental actions to spread environmental awareness throughout the business. Strategic environmental management includes planned-programmed regulations in the structure, systems and activities of the business to comply with the changes around the business or to improve the adaptation capacity of the business to such changes. In green value chain implementations, the aim is to achieve the concept of "from cradle to grave, kill off the pollution before it happens" (9).

Green Marketing and Sales: Green marketing practices, including environmentally friendly pricing, promotion and delivery of the products of a business, aim to create a value for all sharers of the business. At this point, environmentally conscious customers are able to know and prefer environment-friendly products and the marketing approach is shaped around the preferences of consumers. Beside environmentally conscious product development activities, businesses also have green packaging (13), ecologic labeling (14) like environmental activities.

Green Services: Green consumers select and use environmentally friendly products, require to be informed about the conscious disposal of the products and provide feedback after use of the products. All these issues force businesses to provide post-sale services. Such services include a "product stewardship" program indicating the monitoring of a product throughout its lifecycle (14), updating product labels, promoting environmentalist ideas and implementations, providing environmentally friendly disposal and the recycling of used products.

2.1.2. Support Activities

As can be seen in Table 1, support activities in green value chain implementations are considered under two headings as internal and external. These activities are briefly explained below.

2.1.2.1. Internal Support Activities

Green Infrastructure Development: Green infrastructure development includes the activities involved in developing a conducive operating environment suitable for GVA. The organizational structure, control mechanisms and organizational culture usually impact infrastructure environment of a firm (11). Environmental standards guide businesses in infrastructure formation and the development of green activities.

Green Human Resource Management: Businesses have to adapt their own human resources policies to changing conditions while developing and introducing green products, efficient waste management systems and establishing new relationships with environmentally conscious sharers (15). Unless they convince and motivate their staff to environmental consciousness, the implementation of an environmentally friendly approach will never be possible. Therefore, the pre-condition for the success of environmentally related programs is to ensure the awareness and commitment of staff to such programs (16).

Green Technology Adoption: The technologies protecting the environment, polluting less, using all resources in a sustainable fashion, recycling wastes at high rates and disposing of them efficiently are all defined as green technologies (17). Such technologies form the focus of the technology and management practices of a business. The use and adoption of green technologies deeply affect all the production functions and activities of the business. Moreover, technologic compliance may provide significant benefits to reduce production costs and to gain a competitive advantage and also to minimize the environmental impacts of business activities and implementations. Such a case means both an economic and ecologic gain/value for the business.

Green Procurement: Environmental standards and procedures play a significant role in the regulation and control of the environmentally related issues of businesses. Businesses should comply both with legal environmental regulations and the regulations issued by the environmental management system of the business, if there is one, in both current production activities and in new products and investments. Such a case may provide benefits in the determination of both current and possible future environmental impacts on the business. Green regulations play a key role in pollution prevention and the reduction of pollutant sources, recycling or re-use of used products.

2.1.2.2. External Support Activities

Government Policy, Regulation: Most governments in the world are committed to environmental protection as a priority issue (11). According to Henriques and Sadorsky (1999), the primary factors' forcing businesses to environmental consciousness are the legal regulations shaped around government policies (18). The negative impacts of businesses on the environment are mostly controlled by issuing legal regulations. Within the concept of "polluter pays", high fines for environmental pollution, sometimes even higher than the cost of pollution prevention measures and technologies, force businesses to act in an environmentally conscious fashion.

Public Support: The prominence of environmental problems and sustainability actions has not only businesses but also governments conscious about the environment. In particular all kinds of state-initiated environmentally related projects, works or research & development studies are supported under various headings. In addition, environmental investments are either financed by incentives or they are subjected to tax exemptions.

Economic Condition: There is a positive relationship between proper economic conditions and environmental initiatives (19). Green entrepreneurs initially evaluate the economic conditions of the country and business as the success factor of investments. A healthy economy makes significant contributions to the purchase and investment decisions of businesses.

NGO (Non-Governmental Organizations): Since the 1970s, environmental activists have viewed businesses as the focus of environmental problems and put them under pressure to be the solution those problems (9). Since the support of voluntary organizations may mean the support of several sharers, such support plays a great role in the environmentally conscious acts of businesses (11).

2.2. Antecedents of Green Value Chain Implementations

The ever-increasing significance of environmental management has forced businesses to set their positions in environmental issues and has forced managers to reevaluate their value chain activities and implementations (7). The reasons why environmental practices motivate businesses, or the expected benefits from such practices, are considered under four headings in the literature (20, 18, 21, 3): regulation, public concern (corporate image), expected competitive advantage and top management's commitment

Regulations and Laws: These two factors constitute the primary factors forcing businesses to adopt environmental consciousness. In this sense, with these regulations, policy makers tend to monitor entire processes from the design to packaging and delivery and even the disposal of an item (21).

Public Concerns: This is an external environmental factor which is effective in the environmentally conscious behaviors of businesses. Environmentalist actions, pressure exerted by consumers and green products, allow people to be conscious about the environment. Businesses should definitely pay heed to the voices raised from society.

Expected competitive advantages: To be superior over competitors or expect competitive advantage is among the primary factors forcing businesses to act in an environmentally conscious fashion. In general, businesses tend to cost reduction, differentiation and focusing like competitive strategies to gain a competitive advantage. However, in recent years, they have realized that environmentally oriented activities may also provide competitive advantages. Therefore, they have put more emphasis on environmentally related activities.

Top management commitment: It is very difficult to implement environmental activities in businesses without the commitment and support of top management (22). The organization is motivated, guided, and the perception and sustainability of the actions are provided by top management with a green management perspective.

2.3. Results of Green Value Chain Implementations

Gandhi et al. (2006) suggested that the greening of the value chain will finally lead to future sustainability with the formation of win-win collaboration with regulatory, measures the community and consumers. With these practices, the negative impacts on the environment are minimized, the demands of green consumers are met and eco-productive products come into prominence (23). Such outcomes provide a sustainable competitive advantage to businesses. With green value chain analysis, sustainable competitive advantage may either be evaluated under financial, social and ecologic performance (6) or under financial and non-financial performance (3) or economic and socio-ecologic performance (4, 5).

Economic performance: Existing studies have shown that sustainable competitive advantage via green value chain initiatives can lead to superior marketplace performance which can be measured in conventional terms such as market share, customer satisfaction etc., and financial performance such as return in investment shareholder wealth creation, profitability etc. (26, 27).

Socio-Environmental Performance: The socio-environmental performance, also known as non-financial performance, of a company is demonstrated by indicators such as acquired environmental standards, improved 7 customer loyalty, greater satisfaction of employees etc. and can only be achieved by implementing a systematic approach through setting environmental objectives and targets (3). GVCI will also lead to cleaner, greener, and much more efficient operations, better environmental performance by reducing damages to the latter, besides overall improvement of the company's image. It is believed that environmental benefits enjoyed there from will spill over to the general public and thus will improve social performance (4, 5). In brief, green value chain implementations target more sustainable development through increasing business image, sales, market share and profit.

3. Results and Discussion

3.1. Theoretical Framework and Hypothesis

Following the conceptual framework defined above, a research model was developed in the present study to determine the relationships among the antecedents, initiatives and results of green value chain implementations.

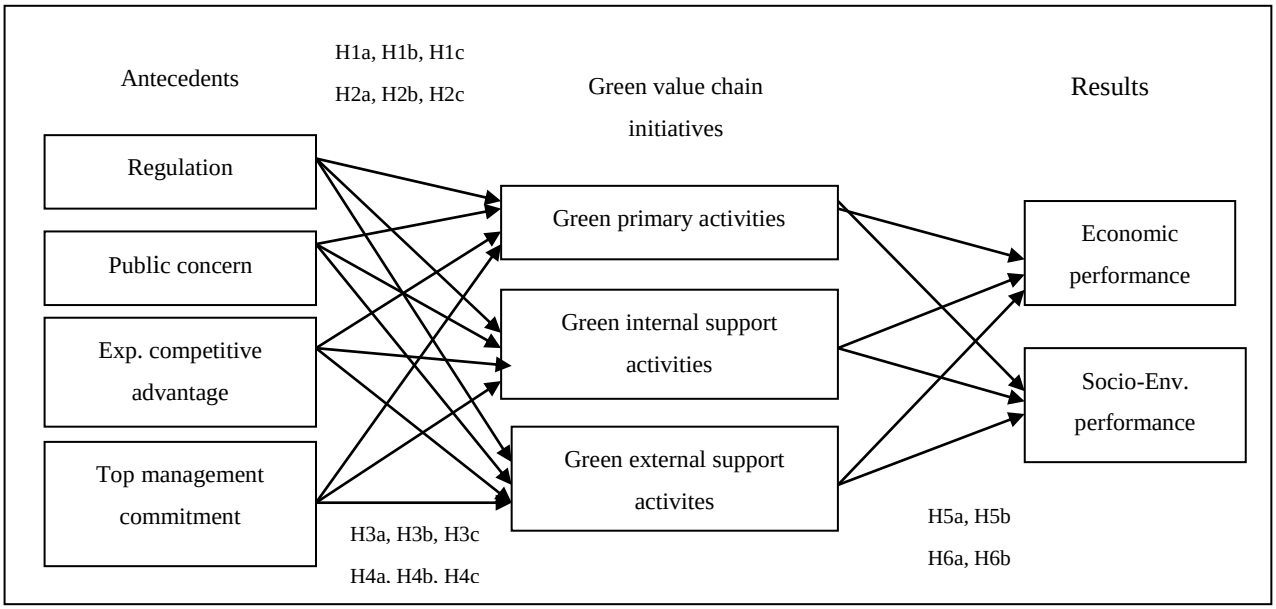


Fig. 1. Study model.

3.1.1.Antecedents of Green Value Chain Implementations

While businesses used to envisage the natural environment as an externality in the past, today they see it as a strategic factor and take it into consideration in every aspect of business. Legal enforcements and regulations have put businesses under pressure in term of their environmental activities (18, 8, 11) and such activities are also affected by several factors such as environmentalist actions, public and image concerns, customer expectations, development of the green competitive concept, changes in social responsibility perceptions and the perception of environmental standards (20, 18, 21, 9, 3). Within this framework, the

following hypotheses were formed in the current study:

H 1a: There is a positive significant relationship between legal regulations and green primary activities.

H 1b: There is a positive significant relationship between legal regulations and green internal support activities.

H1c: There is a positive significant relationship between legal regulations and green external support activities.

H 2a: There is a positive significant relationship between public concerns and green primary activities.

H 2b: There is a positive significant relationship between public concerns and green internal support activities.

H 2c: There is a positive significant relationship between public concerns and green external support activities.

H 3a: There is a positive significant relationship between expected competitive advantage and green primary activities.

H 3b: There is a positive significant relationship between expected competitive advantage and green internal support activities.

H 3c: There is a positive significant relationship between expected competitive advantage and green external support activities.

H 4a: There is a positive significant relationship between top management commitment and green primary activities.

H 4b: There is a positive significant relationship between top management commitment and green internal support activities.

H 4c: There is a positive significant relationship between top management commitment and green external support activities.

3.1.2. Results of Green Value Chain Implementations

It was reported in the literature that green management practices yielded positive outcomes such as clean and green implementations, improvement and developments in processes, profitability, competitive advantage in products and services, increase in market share, development in company image and management systems (10, 1, 11, 3, 25, 28, 6, 4, 5). Moreover, the results of green value chain implementations are mostly evaluated within the frame of sustainable competitive advantage and social responsibilities of the businesses (1, 28, 6, 4, 5). While economic or financial performance constitutes the competitive advantage dimension of green value chain implementations, non-financial or socio-ecologic performance is evaluated under the social responsibilities of businesses. Within this framework, the following hypotheses were formed:

H 5a: There is a positive significant relationship between green primary activities and economic performance.

H 5b: There is a positive significant relationship between green primary activities and socio-ecologic performance.

H 6a: There is a positive significant relationship between internal support activities and economic performance.

H 6b: There is a positive significant relationship between internal support activities and socio-ecologic performance.

H 7a: There is a positive significant relationship between external support activities and economic performance.

H 7b: There is a positive significant relationship between external support activities and socio-ecologic performance.

3.2. Universe and Sample

Businesses operating in the Kayseri Organized Industrial Region constituted the universe of the study. Among the 822 businesses on the list of the Regional Directorate of Kayseri Organized Industry, 486 large and medium size ones (with more than 50 employees) constituted the universe. Research data were gathered

through surveys conducted with the managers of quality departments or the managers responsible for the environmental practices of the businesses. Among the businesses, 182 responded to surveys and the respond rate was calculated as 41.73%.

3.3. Measures

The survey forms used to gather data were composed of three sections. There were 10 questions in the first section about the manager and the business to which the survey was applied, there were 41 statements in the second section about the factors forcing businesses to apply value chain implementation, and there were 17 statements in the last section about the results of green value chain implementations. The scales used in the study are presented below:

- Antecedents of green value chains: These were measured by the 5-point Likert scale developed by Cater et al. (2009) with 18 statements (3) indicating that the "environmental strategies of our business are primarily shaped around government regulations". Scale reliability, the Cronbach alpha value, was calculated as 0.902. Within the scale, 1 represents "certainly disagree" and 5 represents "certainly agree".
- Initiatives of green value chain: These were measured by the 5-point Likert scale developed by Yang et al. (2011) with 23 statements (29) indicating that the "product designs and plans of our business are tried to be made with an environmental focus". Scale reliability, the Cronbach alpha value, was calculated as 0.934. Within the scale, 1 represents "certainly disagree" and 5 represents "certainly agree".
- Results of green value chain implementations: These were measured by the 5-point Likert scale developed by Rao and Holt (2005) with 17 statements (24) indicating that the "productivity of our business has increased after green value chain implementations". Scale reliability, cronbach alpha value, was calculated as 0.941. Within the scale, 1 represents "certainly disagree" and 5 represents "certainly agree".

4. Research Results

4.1. Demographic Characteristics

Table 2 Demographic characteristics of participant managers and businesses

Characteristics		Frequency	Percentage	Characteristics		Frequency	Percentage
Gender	Male	151	82.5	Education	Primary school	12	6.6
	Female	32	17.5				
	Total	183	100		High school	50	27.5
Age	20-30	53	29.1		Vocational college	12	6.6
	31-40	77	42.3		Undergraduate	107	58.2
	41-50	35	19.2		graduate	2	1.1
	51 +	17	9.5		Ph.D	-	-
	Total	183	100		Total	183	100
Business size	50-100 employees	137	75.3	Legal status	Incorporation	53	29.1
	101-200 Employees	19	10.4		Limited company	107	58.2
	200+ employees	27	14.3		Private company	24	12.6
	Total	183	100		Total	183	100

Of the participants (Table 2), 29.1% were below the age 40, 42.3% were aged 31-40, 19.2% were aged 41-50 and 9.5% were over the age of 51. Male participants constituted 82.5% of total participants. With regard to the educational level of the 183 participants, 107 of them had graduate and higher level of education. With regard to business size, 75.3% of participant businesses have between 50-100 employees, 10.4% of them have between 101-200 employees and 14.3% have over 201 employees.

Demographic characteristics were used neither as dependent nor independent variables. Also, they were not used in hypothesis, relationship or difference analyses. They were just used to gather information about the study universe and to interpret the hypotheses.

4.2. Mean Values of Research Variables

Table 3 Mean and Standard Deviations of Variables

Variable		Mean	Standard Deviation
Antecedents of green value chain		**3.67**	**0.62**
implementations	Regulation	3.84	0.72
	Public Concern	3.55	0.72
	Expected Competitive Advantages	3.54	0.89
	Top Management Support	3.67	0.90
Initiatives of green value chain		**3.62**	**0.69**
implementations	Green Primary Activities	3.67	0.75
	Green Internal Support Activities	3.52	0.88
	Green External Support Activities	3.67	0.73
Results of green value chain		**3.77**	**0.66**
implementations	Economic Performance	3.59	0.72
	Socio-Ecologic Performance	3.95	0.71

In the present study, the dimensions of the antecedents of green value chain implementations (regulation, public concern, expected competitive advantages and top management support) had scores above the means (3.84, 3.55, 3.54 and 3.67, respectively). Green value chain initiatives also had similar means (3.67, 3.52 and 3.67). Among the results of green value chain implementations, socio-ecologic performance had a higher score (3.95) than economic performance (3.59).

4.3. Correlation Table

The correlation matrix indicating the relationships among antecedents, initiatives and results of green value chain implementations are provided in Table 4.

Table 4. Correlation Matrix

	1	2	3	4	5	6	7	8	9
1. Regulation	1								
2. Public concern	.454**	1							
3. Exp. comp. advantages	.436**	.645**	1						
4. Top man. support	.425**	.559**	.630**	1					
5. Green primary act.	.412**	.629**	.726**	.747**	1				
6. Green int. support act.	.382**	.500**	.546**	.634**	.694**	1			
7. Green ext. support act.	.291**	.495**	.474**	.576**	.655**	.686**	1		
8. Economic perf.	.183*	.175*	.248**	.219**	.276**	.467**	.399**	1	
9. Socio-ecologic perf.	.224**	.161*	.152*	.214**	.315**	.411**	.305**	.703**	1

** p > 0.01, *p > 0.05

As can be seen in Table 4, there was a positive significant relationship between the antecedents of green value chain implementations (regulations, public concerns, expected competitive advantage and top management support) and green primary activities. The level of relationships was medium and increasing green value chain implementations were observed with increasing factors motivating the businesses to green value chain implementations. Similarly, a positive significant relationship was observed between green primary activities and the results of green value chain implementations.

4.4. Hypothesis Testing

The research model and hypotheses of the model were tested through multiple regression analyses and results were interpreted accordingly.

Table 5 Results of regression analysis performed to determine the effects of antecedents of green value chain implementations on green primary activities

	R	R^2	Adjusted R^2	Standard error of estimation	F	Sig.
Green primary activities	0.824	0.679	0.671	0.417	60.512	0.00

P < 0.05, Dependent Variable: Green primary activities, Independent Variable: Regulations, public concerns, expected competitive advantage, top management commitment

As can be seen in Table 5, 67.9% of variation in green primary activities can be explained by antecedents orienting the businesses to green value chain implementations. A valid F value of 60.512 at 0.00 significance level indicates that the model is valid as a whole.

Table 6 Coefficients of regression analysis performed to determine the effects of antecedents of green value chain implementations on green primary activities

	Non-standardized coefficients		Standardized	t	Sig.
	Beta	Standard error	Beta		
Constant	0.692	0.202	0.016	3.432	0.01
Regulations	0.017	0.053	0.148	0.327	0.74

Public concerns	0.149	0.060	0.371	2.469	0.01
Exp. competitive advantage	0.313	0.051	0.419	6.090	0.00
Top management commitment	0.345	0.047		7.384	0.00

Table 6 presents the results of multiple regression analysis performed to see the effects of independent variables composed of the antecedents of green value chain implementations (regulations, public concerns, expected competitive advantage and top management commitment) on dependent variable green primary activities. The results revealed the significant effects of public concerns (0.01), expected competitive advantage (0.00) and top management commitment (0.00) on green primary activities. The regulations did not have any significant effect on green primary activities. With these results, hypothesis H1a was rejected and hypotheses H2a, H3a and H4a were accepted.

Table 7 Results of regression analysis performed to determine the effects of antecedents of green value chain implementations on green internal support activities

	R	R^2	Adjusted R^2	Standard error of estimation	F	Sig.
Green Internal support act.	0.655	0.430	0.417	0.661	33.132	0.00

P < 0.05, Dependent variable**:** Green internal support activities, independent variable: Regulations, public concerns, expected competitive advantage, top management commitment

Table 8 Coefficients of regression analysis performed to determine the effects of antecedents of green value chain implementations on green internal support activities

	Non-standardized coefficients		Standardized	t	Sig.
	Beta	Standard error	Beta		
Constant	0.579	0.319	0.060	1.811	0.07
Regulations	0.077	0.084	0.137	0.922	0.38
Public concerns	0.164	0.096	0.160	1.712	0.08
Exp. competitive advantage	0.160	0.082	0.417	1.964	0.05
Top management commitment	0.409	0.074		5.521	0.00

As can be seen in Tables 7 and 8, the antecedents of green value chain implementations were able to explain 43% of the variations in green internal support activities. While expected competitive advantage (0.005) and top management commitment (0.00) had significant impacts on green internal support activities, regulations and public concerns did not have any significant effects on green internal support activities. Therefore, hypotheses H1b and H2b were rejected and hypotheses H3b and H4b were accepted

Table 9 Results of regression analysis performed to determine the effects of antecedents of green value chain implementations on green external support activities

	R	R^2	Adjusted R^2	Standard error of estimation	F	Sig.
Green external support act.	0.600	0.360	0.345	0.57	24.722	0.00

P < 0.05, Dependent Variable**:** Green external support activities, Independent Variable: Regulations, public concerns, expected competitive advantage, top management commitment

Table 10 Coefficients of regression analysis performed to determine the effects of antecedents of green value chain implementations on green external support activities

	Non-standardized coefficients		Standardized	T	Sig.
	Beta	Standard error	Beta		
Constant	1.641	0.277	-0.049	5.916	0.00
Regulations	-0.052	0.073	0.256	-0.716	0.47
Public concerns	0.251	0.083	0.072	3.021	0.00
Exp. competitive advantage	0.059	0.071	0.384	0.835	0.45
Top management commitment	0.309	0.064		4.796	0.00

As can be seen in Table 9, the R value indicating the relationship between the antecedents of green value chain implementations and green external support activities was found to be 0.600. There was a medium level positive significant relationship between the antecedents of green value chain implementations and green external support activities. The F value was calculated as 24.752. The model was valid as a whole at 0.00 significance level and the antecedents of green value chain implementations were able to explain 36% of the variations in green external support activities. Results of the t-test for the significance of regression coefficients revealed the significant effects of public concerns (0.00) and top management commitment (0.00) on green external support activities. Based on these results, hypotheses H1c and H3c were rejected and hypotheses H2c and H4c were accepted.

Table 11 Results of regression analysis performed to determine the effects of initiatives of green value chain implementations on economic performance

	R	R^2	Adjusted R^2	Standard error Of estimation	F	Sig.
Economic performance	0.492	0.242	0.229	0.64	19.029	0.00

P < 0.05, Dependent variable**:** Economic performance, independent variable: green primary activities, green internal support activities, green external support activities

Table 12 Coefficients of regression analysis performed to determine the effects of initiatives of green value chain implementations on economic performance

	Non-standardized coefficients		Standardized	T	Sig.
	Beta	Standard error	Beta		
Constant	2.145	0.263	-0.163	8.162	0.00
Green Primary activities	-0.158	0.093	0.440	-1.696	0.09
Green Int. support activities	0.363	0.083	0.205	4.400	0.00
Green ext. support activities	0.203	0.095		2.150	0.03

According to the results of multiple regression analysis performed to test the effects of initiatives of the green value chain implementations on economic performance (Tables 11 and 12), green value chain initiatives composed of green primary activities, green internal support activities and green external support activities were able to explain 24.2% of the variation in economic performance. The results of t-tests indicated the significant effects of green internal and external support activities on economic performance. Therefore, hypothesis H5a was rejected and hypotheses H6a and H7a were accepted.

Table 13 Results of regression analysis performed to determine the effects of initiatives of green value chain implementations on socio-ecologic performance

	R	R^2	Adjusted R^2	Standard error of estimation	F	Sig.
Socio-ecologic performance	0.413	0.171	0.157	0.65	12.286	0.00

P < 0.05, Dependent variable**:** socio-ecologic performance, independent variable: green primary activities, green internal support activities, green external support activities

Table 14 Coefficients of regression analysis performed to determine the effects of initiatives of green value chain implementations on socio-ecologic performance

	Non-standardized coefficients		Standardized	t	Sig.
	Beta	Standard error	Beta		
Constant	2.661	0.270	0.049	9.861	0.00
Green primary activities	0.047	0.096	0.357	0.486	0.62
Green int. support activities	0.290	0.085	0.028	3.421	0.00
Green ext. support activities	0.028	0.097		0.283	0.77

As can be seen in Tables 13 and 14, the independent variables initiatives of green value chain implementations were able to explain 17.1% of the variation in dependent variable socio-ecologic performance. While the significant effects of green internal support activities (0.00) were observed on socio-ecologic performance, the effects of green primary activities and green external support activities were not found to be significant on socio-ecologic performance. Thus, hypothesis H6b was accepted and hypotheses H5b and H7b were rejected.

5. Conclusions

The implementations able to serve a sustainable competitive advantage in global markets have strategic significance in today's world. Ever-changing and developing dynamic conditions, on the one hand, and the legal enforcements of state and governments and customer expectations on the other generate pressure on businesses and force them to look for new management approaches. Protection of the natural environment came into prominence especially at the end of the 1980s with the huge environmental problems and accidents at the time. The negative impacts of such problems also exerted pressure on the businesses since they were envisaged as the primary responsible sources of such problems. Therefore, since then, businesses have aimed to apply environmental implementations both to meet legal regulations, the expectations of the public and their customers and to gain a competitive advantage. Within this framework, the concept of "green value chain", considered among new management practices, was evaluated and the relationships among antecedents, initiatives and results of green value chain implementations were investigated in the present study. A model was created and hypotheses were formed to test such relationships.

Initially, the relationships between the antecedents of green value chain implementation (regulations, public concerns, expected competitive advantage and top management commitment) and initiatives of green value chain implementations (green primary activities, green internal support activities and green external support activities) were investigated and a relationship was not observed between the regulations and initiatives of green value chain implementations. While such findings do not support the findings of (7, 10, 11, 25), they support the findings of (4). On the other hand, significant relationships were observed between public concerns and green primary and external support activities. Such findings partially support the findings of (7, 10, 11), but do not support the findings of (25). Significant relationships were also observed between expected competitive advantage and green primary and external support activities. These findings comply with the findings of (7, 10, 11). Finally, positive significant relationships were observed between top management commitment and initiatives of green value chain implementations (green primary activities, green internal support activities and green external support activities). Such findings support the findings of (10) and (25).

Subsequent analyses were performed to test the relationships between initiatives of green value chain implementations (green primary activities, green internal support activities and green external support activities) and economic and socio-ecologic performance. While no relationship was observed between green primary activities and economic, socio-ecologic performance, a positive relationship was observed between green external support activities and economic performance and between green external support activities and both economic and socio-ecologic performance. Previous studies reported positive relationships between environmental implementations and operational performance criteria such as a decrease in environmental accidents, an increase in research & development works, a decrease in process costs and an increase in quality (1, 2). There are also studies reporting the relationships of environmental implementations with only economic performance (3) and with both economic and social or socio-economic performance (2, 4, 5). At this point, current findings comply with the findings of (2) and (4).

To conclude, regulations, public concerns, expected competitive advantage and top management commitment, which were indicated as antecedents of green value chain implementations and forced businesses to environmental consciousness, were found to be related to green value chain initiatives. In addition, green value chain initiatives covering green internal support activities such as human resources training and development, creation of a green business

culture, giving priority to environmentally friendly technologies and internalization of environment standard certificates had various impacts on both the economic and socio-ecologic performance of businesses. In this sense, it can be stated that green primary activities do not affect business performance provided that they are realized within the scope of legal regulations and public concerns but green external support activities including incentives of the state and government, foreign cooperation and economic conditions have significant effects on economic performance.

There are some limitations to the current study. Initially, since business performance was evaluated with regard to the perceptions of managers, it may not be subjective. Also, a regional study may not be generalized over the entire country. In any case, participating businesses are aiming towards green management, green value chain implementations and environmentally friendly activities. In future studies, value creation within the scope of green value chain implementations, possible cooperation, sustainable competitive advantage creation considering internal and external customers may be focused on. Such studies may even cover various regions or nations.

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