International Journal of Economics and Finance; Vol. 8, No. 8; 2016
ISSN 1916-971X E-ISSN 1916-9728
Published by Canadian Center of Science and Education

Enhancing Marketing Efficiency of the Saudi Dates at the National and International Markets

Al-Abdulkader, Ahmed M.[1], Al-Kahtani, Safar H.[2], Ismaiel, Sobhy M.[2], Elhendi, Ahmed M.[2], Saad, Ali I.[1], Alamri, Yosef A.[2] & Al-Dakhil Abdullah I.[1]

[1] King Abdulaziz City for Science and Technology, Kingdom of Saudi Arabia

[2] King Saud University, Kingdom of Saudi Arabia

Correspondence: Al-Abdulkader, Ahmed M., King Abdulaziz City for Science and Technology, Kingdom of Saudi Arabia. E-mail: akader@kacst.edu.sa

Received: May 12, 2016 Accepted: June 7, 2016 Online Published: July 25, 2016

doi:10.5539/ijef.v8n8p53 URL: http://dx.doi.org/10.5539/ijef.v8n8p53

Abstract

Date sector is a considerate sector worldwide with an estimated trade value equivalent to about 3.72 billion Saudi Riyals (SR) in 2013. Enhancing marketing efficiency of dates becomes imperative to nations that date sector has a special status in their economies and social heritage such that of the Kingdom of Saudi Arabia.

This research paper is targeted to estimate the marketing efficiency of dates at different marketing channels qualitatively using a typical five level LIKERT scale and quantitatively using the Two-Stage Data Envelopment Analysis (2s DEA), to estimate the potential economic impact of improving marketing efficiency on the date marketing channels and on the national economy, and to introduce a set of policies and mechanisms that enhance the competitiveness of the Saudi dates at the local and international markets.

The estimated results showed that the total market value of the Saudi dates is about 22.65 billion SR annually, and there is a great potential to improve date marketing efficiency to achieve an additional 30 per cent of value added to traders and the national economy, equivalent to about 6.88 billion SR annually. The research paper concluded with a set of policies and mechanisms to enhance the marketing efficiency and the competitiveness of the Saudi dates at the local and international markets.

Keywords: marketing efficiency, LIKERT scale, satisfaction on marketing services, policies and mechanisms, and national economy

1. Introduction

Date sector is a considerate sector in most of worldwide nations with an estimated trade value equivalent to about 3.72 billion Saudi Riyals (US $ 1 = SR 3.75) in 2013. Enhancing marketing efficiency of dates is imperative to nations that date sector has a special status in their economies and social heritage such that of the Kingdom of Saudi Arabia.

The worldwide perspective of date sector envisaged the competitive advantage of the Kingdom of Saudi Arabia (the Kingdom) among the other nations in terms of allocated area, market share, consumption, and production of dates.

The Kingdom ranked first worldwide in terms of the allocated area for dates, with an estimated average of about 168.92 thousand tons in 2013, which is equivalent to about 16 per cent of the worldwide allocated area for dates, Figure 1, (FAO, 2015).

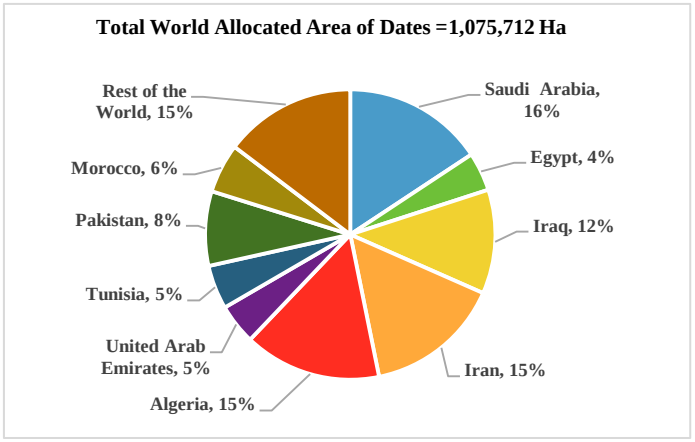

Figure 1. World allocated area of dates – 2013 (FAO, 2015)

It ranked second worldwide in terms of market share with an estimated volume of about 99.8 thousand tons valued to about SR 388.39 million in year 2013, which is equivalent to about 10 per cent of the world market of dates (FAO, 2015).

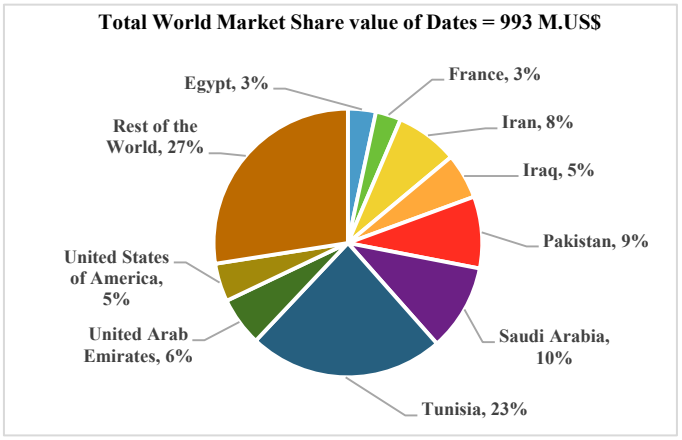

Figure 2. World market share of dates – 2013 (FAO, 2015)

Also, it ranked second worldwide in terms of dates consumption, with an estimated volume of about 966.78 thousand tons in 2011, which is equivalent to about 16 per cent of world date consumption (FAO, 2015), Figure (3), with an average per capita consumption of about 34.80 kg per year.

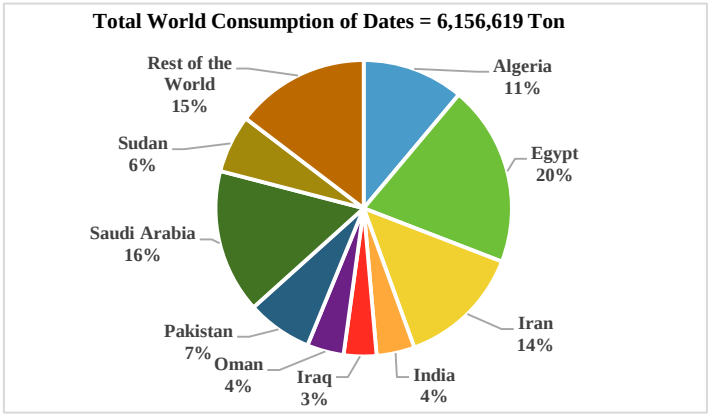

Figure 3. World consumption of dates – 2011 (FAO, 2015)

The Kingdom ranked third in terms of world date production with an estimated volume of about 1.06 million tons, which is equivalent to about 15 per cent of the world date production in 2013, Figure 4 (FAO, 2015).

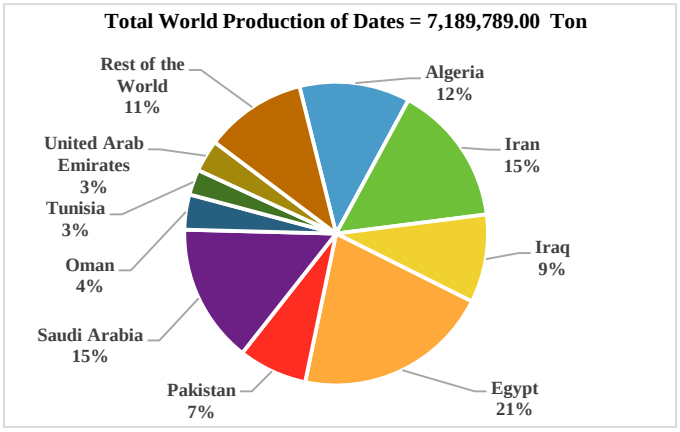

Figure 4. World production of dates – 2013 (FAO, 2015)

Wording differently, the Kingdom owns about 16 percent of the world wide allocated areas of dates, produces about 15 per cent of the worldwide production of dates, consumes about 16 per cent of the world wide consumption of dates, and shares 10 per cent of the world market of dates.

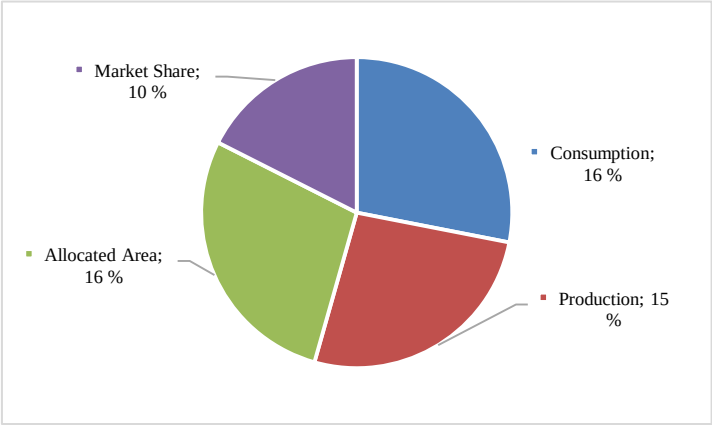

Figure 5. The world share of the Kingdom of Saudi Arabia in date sector (FAO, 2015)

This research paper is targeted to estimate the marketing efficiency of dates at different marketing channels qualitatively using a typical five level LIKERT scale and quantitatively using the Two-Stage Data Envelopment Analysis (2s DEA), to estimate the potential economic impact of improving marketing efficiency on the date marketing channels and on the national economy, and to introduce a set of policies and mechanisms that enhance the competitiveness of the Saudi dates at the local and international markets.

Ultimately, the potential outcomes of this research paper will add value to the national endeavor to enhance the competitive advantage and the market share of the Saudi dates at the national and international markets.

Applying data envelopment analysis (DEA) was first suggested by (Charnes et al., 1985) to gain insights into the efficiency of marketing efforts. Since then, there have been a number of marketing studies that used the DEA to assess the relative efficiency of sales units (Mahajan, 1991), to evaluate multiple retail stores for their efficiency (Kamakura et al., 1996), to estimate the relative efficiency of advertising campaigns characterized by multiple inputs and multiple outputs (Luo & Donthu, 2001), to evaluate the technical efficiency and performance of the date processing industry in Saudi Arabia (Al-Abdulkader, 2006), to examine the economic implications of

adopting the variable-rate application of fertilizers and the determinants of adopting this PF technology utilizing data from Czech (Curtiss & Jelinek, 2012), to estimate technical Data Envelopment analysis, allocative, cost, and scale efficiency of tomato in Egypt (Alboghdady, 2014), to evaluate the efficiency of citrus producing properties in Brazil, using the non-parametric data envelopment analysis approach to calculate technical efficiency levels (Clemente et al., 2015).

The application of the Two-Stage Data Envelopment Analysis (2s DEA) in date marketing of Saudi Arabia was first considered by Al-Abdulkader et al. (2015) to assess the interlinkage between date marketing efficiency in Saudi Arabia and estimates of technical and cost efficiency. However, more efforts have been exerted to study other aspects of date marketing in Saudi Arabia. Alkahtani, et al. (2016) analyzed marketing volume transaction of dates at different marketing channels. Almodarra and Saghaian (2016) measured the competitiveness of Saudi date exports in some selected international markets. Abdel Mohsen et al. (2014a, 2014b) analyzed the competitiveness and the responsiveness of Saudi dates exports demand. Abdel Gawad et al. (2014) identified the determinants of competitive advantages of Saudi dates exports in selected international markets.

2. Methods

This research paper surveyed 298 date traders, representing the diverse marketing channels at selected date market places in the Kingdom, namely, wholesalers, retailers, and exporters. The collected information was investigated qualitatively using a typical five level LIKERT scale and quantitatively using the two-stage data development analysis approach (2s DEA). Date wholesalers, retailers and exporters were included in estimating marketing technical and cost efficiencies.

Building on the estimated results of the 2s DEA, the impact of improved marketing efficiency on the potential economic return of the marketing channels and the national income were assessed.

The typical five-level LIKERT scale was applied to determine the average record of satisfaction with the quality and the cost of provided market services including transportation, storage, sorting, grading and packaging, as follows:

- Unsatisfied: shows very low degree of satisfaction among respondents, with grades ranging between 1–1.80.
- Satisfied to some extent: shows low degree of satisfaction among respondents, with grades ranging between 1.80 and 2.60.
- Average satisfaction: shows a certain degree of satisfaction among respondents, with grades ranging between 2.61 and 3.40.
- Intermediate satisfaction: shows a high degree of satisfaction among respondents, with grades ranging between 3.41 and 4.20.
- High satisfaction: shows a very high degree of satisfaction among respondents, with grades ranging between 4.21 and 5.00.

The 2s DEA was applied to estimate technical and cost or economic efficiencies for date marketing channels (DMU), and to assess the impacts of efficiency determinants of DMU in an econometric framework using TOBIT model.

At the first stage of the DEA, traditional inputs represented by date marketing functions (X) and outputs represented by date marketing objectives (Y) are solved. In the second stage, the efficiency scores from the first-stage are regressed upon the efficiency determent variables (Coelli et al., 1998-2005).

Technical efficiency (TE) measures the potential input reduction that the DMU could apply without reducing its output level (input-output orientation). It measures, also, information about the potential output increase that a DMU could implement without increasing the use of inputs (output-input orientation). Both orientations will produce close TE estimates in the case of constant returns to scale. While, additional components are required to estimate the TE estimates in the case of variable returns to scale. Cost efficiency (CE), on the other hand, measures the potential reduction in production costs (cost efficiency) or the potential increase in revenue (revenue efficiency) that a DMU could apply to operate at the point of technical and allocative efficiency.

The optimized scoring function (H) of the considered DEA model is defined as the ratio of the weighted sum of date marketing objectives (Y1, Y2, and Y3), as output, and the weighted sum of date marketing functions (x1, x2, x3, x4, and x5), as inputs, subject to the constraints that the similar ratios for every DMU is less or equal to one, implying that efficient units will have a score of one. DMU outputs includes marketed date volume in tons (Y1), date marketing margin in 1000s of Saudi Riyals (Y2), and ratio of date marketing margin to date total cost of

marketing (Y3). Inputs of DMU used in marketing dates are, x1, x2, x3, x4, x5, as cost of labor, transportation, grading, storage, and advertising, respectively.

Accordingly, the DEA mathematical approach for each i[th] DMU, is formulated as follows:

$$\max_{u,v} H = (u'y_i / v' x_i) \quad (1)$$

$$st \quad \left(u'y_i / v'x_i\right) \leq 1, \quad j = 1,2,\dots,N$$

$$u, v \geq 0$$

Where $u'y_i/v'x_i$ is the scoring function (where u is an Mx1 vector of output (Y) weights and v is a Kx1 vector of input (x) weights). The goal is to find values for u and v that maximize the efficiency score of the i[th] DMU subject to the constraint that all the efficiency measures must be less than or equal to one. This ratio formulation ensures that 0<Max H<1: a unit will be efficient if and only if this ratio equals unity, otherwise it is considered as relatively inefficient.

In order to identify the technical efficiency of DMU in this research project, the following linear programming problem was solved:

$$\max \quad y_y, \lambda^1, \dots., \lambda^k \quad (2)$$

Subject to:

$$\sum_{k=1}^{k} y^k \lambda^k \geq y^0$$

$$\sum_{k=1}^{k} x_n^k \ \lambda^k \leq x_n^0$$

$$\sum_{k=1}^{k} \lambda^k = 1$$

$$\lambda^k \geq 0$$

where y is an optimal level of output or date marketing objective (Yi), y^k denotes the output of the k^{th} DMU, x_n^k denotes the level of the n^{th} input used on DMU k, x_n^0 is the n^{th} input used on the DMU whose efficiency is being tested, and λ^k is the weight given to DMU k in forming a convex combination of the input vectors. The resulting technical efficiency index is calculated as a ratio between the observed level of output on the DMU being tested (y^0) and the optimal level of output (y). Technically efficient DMUs are those with an efficiency index equal to one. Technically inefficient DMUs are those with an index strictly lower than one.

Cost efficient DMUs (under the assumption of variable returns to scale) are identified by solving:

$$\min \quad \sum_{n=1}^{t} w_n^0 \ x_n \quad (3)$$

Subject to:

$$\sum_{k=1}^{k} y^k \lambda^k \geq y$$

$$\sum_{k=1}^{k} x_n^k \ \lambda^k \leq x_n^0 \ \text{ for } 1 \leq n \leq t$$

$$\sum_{k=1}^{k} x_n^k \lambda^k \leq x_n^o \ \text{ for n} > t$$

$$\sum_{k=1}^{k} \lambda^k = 1$$

$$\lambda^k \geq 0$$

Where w_n^0 is the cost of the n (n=1,…,t) input faced by the DMU whose efficiency is being tested, λ^k is the weight given to DMU k in forming a convex combination of the output or input vectors, x_n denotes the optimal amount of input n (n=1,…,t), y^k denote the output of DMU k (k=1,..,K), x_n^k denotes the level of input n for DMU k, and x_n^0 is the amount of fixed input n on the DMU whose efficiency is being tested.

The cost efficiency index is calculated as the ratio between the optimal cost ($w_n\, x_n^1$) and the observed cost on the k^{th} DMU being tested ($w_n\, x_n^0$). Cost-efficient DMUs are those with a cost efficiency index equal to one. DMUs with an index less than one are characterised as cost-inefficient. Technical efficiency and cost efficiency indexes are relative measures, in the sense that they are obtained by comparing each DMU to DMUs within a reference category.

A TOBIT regression approach was used to estimate the potential determinants of DEA technical and cost or economic efficiencies, with efficiency estimates of (1) as an upper limit and (0) as a lower limit. A number of previous studies have used the same approach of TOBIT model (Binam et al., 2004; Chavas et al., 2005; Cinemre et al., 2006), which is given as follows:

$$EE_i = \beta_0 + \sum_{j=1}^{n} \beta_j V_{ij} + u_i \;\; if\; u_i > -\beta_0 - \sum_{j=1}^{n} \beta_j V_{ij}$$

$$EE_i = 0 \qquad\qquad if\; u_i \leq -\beta_0 - \textstyle\sum_{j=1}^{n} \beta_j\, V_{ij} \qquad (4)$$

Where:

EE_i = The measure of cost or economic efficiency for i[th] DMU.

V_{ij} = Explanatory variables that influence the cost or economic efficiency for i[th] DMU

n = An index of the variables

$\beta\ and\ u$ = Parameters of the model and the random error term, respectively

In order to determine the factors contributing to technical and cost efficiencies, the following model was formulated and estimated using the computer software DEAP (Coelli, 1996).

Efficiency parameter estimates, as dependent variables (outputs), are regressed on a set of explanatory variables which includes both DMU characteristics represented by traders and the efficiency determents for the DMU characteristics. Data from 298 DMU (stores) were collected from Al-Madinah Al-Munawara, Riyadh, Al-Qassim and Al-Hasa as the main date production regions in the Kingdom. Based on scale of marketing dates, five categories were identified as follows: > 500, 100 - <500, 50 - <100, 10 - <50, and < 10 tons of date marketing per year.

For cost efficiency estimation, the costs of last marketing functions are needed per ton of date (Wi), then multiplied by date quantity per tons which has used in each marketing function, x11, x22, x33, x44, x55. Then the parameter relation forms:

$$TEi = Yi = f(x1, x2, x3, x4, x5)$$

$$CEi = Yi = f(W1X11, W2, X22, W3X33, W4X44, W5X55) \qquad (5)$$

Following Kalirajan (1991), efficiency scores will be regressed against the set of DMU- specific factors to obtain the determinants for technical and cost efficiencies. Where, TE_i, CE_i are the technical and cost efficiency of the i[th] date marketing unit DMU.

$$TEi, CEi = a_0 + a_1 H_1 + a_2 H_2 + a_3 H_3$$

$$TEi, CEi = a_0 + a_1 C_1 + a_2 C_2 + a_3 C_3 \qquad (6)$$

Where date trader characteristics are education (H_1), experience (H_2), and job as father (H_3). Efficiency determents for the DMU will include trade type (C1), starting date (C2), ratio of marketing date to other crops marketing (C3). While a_0, a_1, a_2….a_3 are regression parameters estimated by the TOBIT model, using Maximum Likelihood Estimator (MLE).

3. Results and Discussion

3.1 Satisfaction Level on Marketing Services

The level of satisfaction among the date marketing traders with the costs of the provided marketing services at the market places in the Kingdom is described in Figure 6, showing that the satisfaction level on average ranged between a minimum of 2.62 for non-cold storage and a maximum of 2.71 for packaging, grading, and sorting out of 5.00 on the LIKERT scale except transportation which was satisfactory with an average of (2.53).

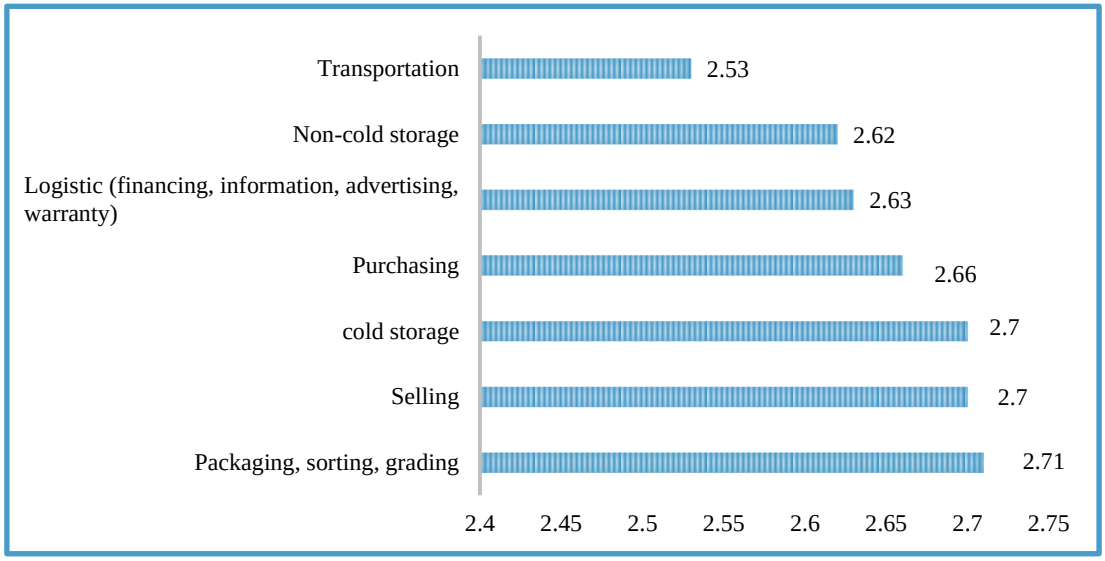

Figure 6. The level of satisfaction on the costs of marketing services

On the other hand, Figure 7 describes the level of satisfaction among the date marketing traders with the quality of the marketing services provided showing that the satisfaction level average ranged between 2.61 and 3.40 out of 5.00 on the LIKERT scale except for the costs of transportation, which were satisfactory with an average of 2.59.

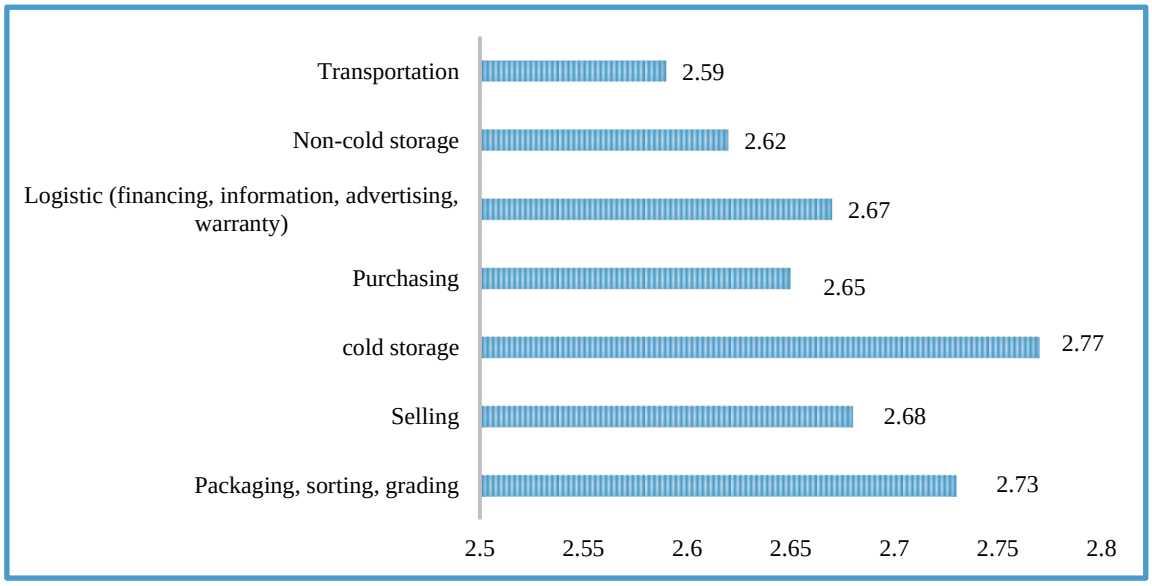

Figure 7. The level of satisfaction on the performance of marketing services

3.2 Marketing Efficiency

Date marketing efficiency includes different parameters such as technical efficiency with constant and variable returns to scale (TE CRS and TE VRS), scale efficiency, return to scale, allocative efficiency (AE), and cost efficiency (CE). Each parameter has its relation to date marketing efficiency.

3.2.1 Wholesaler Date Marketing Efficiency

The results in Table 1 show different date marketing efficiency estimates based on date marketing objectives and scales as follows:

- With all three marketing objectives (Y1+Y2+Y3) and with date marketing scale > 500 tons, all efficiency parameters were full (100 per cent). This supports the recommendation to increase date marketing scale to be more professional in offering marketing functions at minimum costs. Cost efficiency will decrease from 100 per cent to 40 per cent with a marketing scale range from 100 to 500 tons but technical efficiency will remain at the maximum (100 per cent). The differences between cost and technical efficiency are related to date marketing function costs, which will increase as date marketing scale decreases. The technical efficiency of date marketing with constant and variable returns to scale will decrease to 93 per cent and 94 per cent with a date marketing scale of 10 to less than 50 tons, but will increase to 100 per cent when marketing scale decreases to less than 10 tons. This can be explained by joining other crop marketing to date marketing, which will boost date marketing efficiency.
- Date marketing cost efficiency reaches its minimum (40 per cent) with a scale of 100-500 tons. It increases gradually to 56 per cent, 73 per cent, and 100 per cent as the scale of date marketing increases. More improvements need to be done to medium date marketing scales to reduce the costs of date marketing functions. This result coincides with that of the date marketing objective of maximising date quantity (Y1).
- When wholesalers stress the objective of maximising the market margin of date marketing, technical and cost efficiencies are different. As the scale of date marketing decreases from above 500 tons to less than 10 tons, technical efficiency, assuming constant return to scale, is 25 per cent, 44 per cent, 31 per cent, 18 per cent and 30 per cent based on five different scale categories of date marketing. The market margin includes the prices at which dates are bought and sold in addition to the quantity involved. The cost efficiency of date marketing alongside the objective of maximising the marketing margin ranges between 100 per cent for a marketing scale less than 10 tons and 10 per cent for a marketing scale greater than 500 tons. In general, cost efficiency increases as date marketing scale decreases if marketing margin is the wholesaler's only objective for date marketing. The same results coincide with those of having the market margin to marketing cost ratio as the marketing objective of a wholesaler, i.e. date marketing costs do not affect the efficiency of date marketing when it depends on maximising its marketing margin.
- It is important to show the return to scale (RS) for DMUs at different date marketing scales. With date marketing objectives (Y1+Y2+Y3) and (Y1), technical and cost efficiencies were 93 per cent and 73 per cent for the scale 50 to less than 10 tons. To increase its technical and cost efficiency, based on a return to scale, the wholesaler needs to decrease their marketing scale. For the wholesaler's objective of date marketing (Y2) and (Y3) marketing scale greater than 500 tons, technical and cost efficiencies were 25 per cent and 10 per cent respectively. Based on a return to scale, the study results recommend that date wholesalers reduce their marketing scale to increase their efficiency. While increasing date marketing efficiency for date marketing scale less than 500 tons require the wholesaler to increase the scale of marketing dates.

Figures 8 and 9 show the relation between the cost and technical efficiency of wholesaling date marketing with different marketing objectives and scales. These two figures would help in comparing the main differences between larger and smaller date marketing scales.

Table 1. Wholesaling date marketing efficiency in the Kingdom of Saudi Arabia

Date Marketing Objectives	Efficiency Parameters	Date Marketing Scale (tons)				
		>500	100-500	50- <100	10 - <50	<10
Y1+Y2+Y3	TE CRS	1	1	1	0.93	1
All 3 Date Marketing Objectives	TE VRS	1	1	1	0.95	1
	Scale Efficiency	1	1	1	0.99	1
	Return to Scale	-	-	-	DRS	-
	Allocative efficiency	1	0.4	0.56	0.77	1
	Cost efficiency	1	0.4	0.56	0.73	1
Y1	TE CRS	1	1	1	0.93	1
Y1=date quantity(tons)	TE VRS	1	1	1	0.95	1
	Scale efficiency.	1	1	1	0.99	1
	Return to scale	-	-	-	DRS	-
	Allocative efficiency	1	0.4	0.56	0.77	1
	Cost efficiency	1	0.4	0.56	0.73	1

Date Marketing Objectives	Efficiency Parameters	Date Marketing Scale (tons)				
		>500	100-500	50- <100	10 - <50	<10
Y2	TE CRS	0.25	0.44	0.31	0.18	0.3
Y2=Marketing Margin (1000SR)	TE VRS	0.3	0.52	0.52	0.67	1
	Scale efficiency	0.84	0.86	0.59	0.28	0.3
	Return to scale	DRS	IRS	IRS	IRS	IRS
	Allocative efficiency	0.32	0.74	0.98	0.94	1
	Cost efficiency	0.1	0.38	0.51	0.62	1
Y3	TE CRS	0.25	0.44	0.31	0.18	0.3
Y3=Ratio of Marketing Margin to Marketing Costs	TE VRS	0.3	0.52	0.52	0.67	1
	Scale efficiency	0.84	0.86	0.59	0.28	0.3
	Return to scale	DRS	IRS	IRS	IRS	IRS
	Allocative efficiency	0.32	0.74	0.98	0.94	1
	Cost efficiency	0.1	0.38	0.51	0.62	1

Source: Analysis of study data.

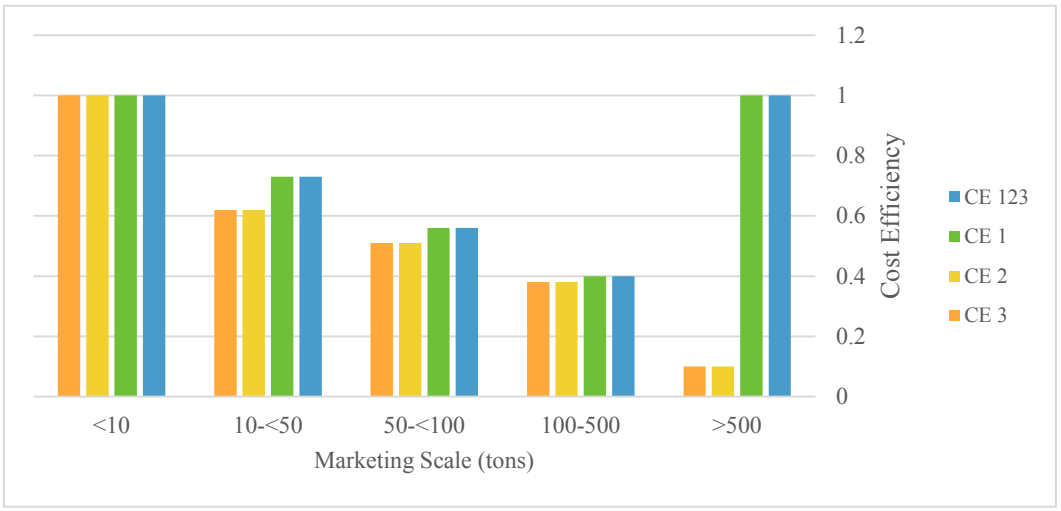

Figure 8. Wholesaling date marketing cost efficiency at different marketing objectives

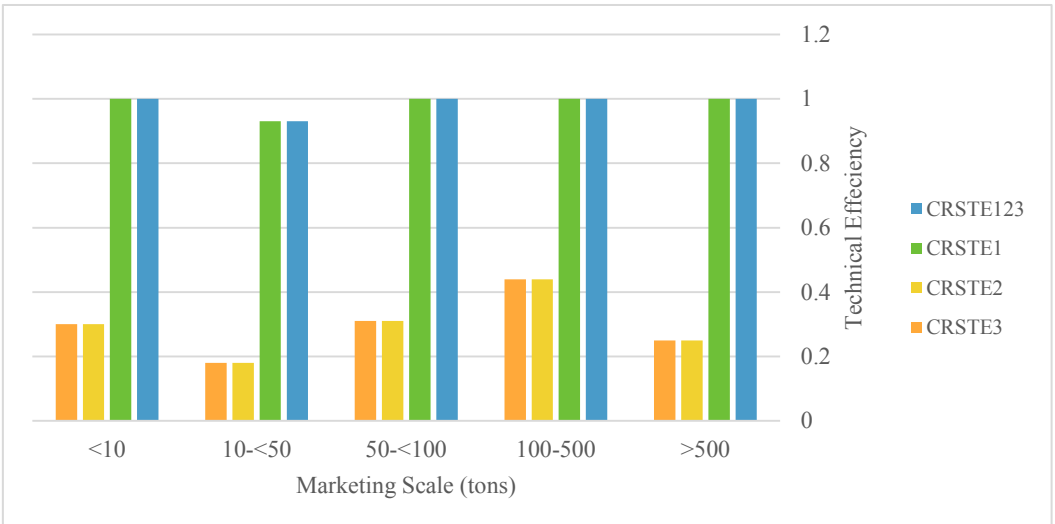

Figure 9. Wholesaling date marketing technical efficiency at different marketing objectives

3.2.2 Retailer Date Marketing Efficiency

The date marketing for greater than 500 tons by retailer has different efficiency estimates, for technical efficiency of date marketing will decrease from 100 per cent to 43 per cent as marketing objectives changed to maximise market margin and its ratio to marketing costs of dates. Also, the cost efficiency will decrease from 100 per cent to 33 per cent. To increase date marketing efficiency, the date retailer need to decrease its marketing scale from greater than 500 tons of date to be less than that.

A date retailer with a marketing scale of 100-500 tons would achieve 100 per cent technical efficiency for marketing objectives (Y1+Y2+Y3) and (Y1) but this decreases to 78 per cent and 88 per cent on the assumption of constant and variable return to scale. The same 100-500 tons marketing scale has cost efficiency of 76 per cent and 70 per cent based with the marketing objective. The cost efficiency will increase to 96 per cent and 86 per cent with the date marketing objectives for a marketing scale of 50-100 tons. Technical efficiency for this scale is 100 per cent but falls to just 51 per cent when the date market objectives are changed from (Y1+Y2+Y3) and (Y1) to (Y2), and (Y3). Increasing the return to scale would increase date marketing efficiency, as the study results recommend. The minimum technical efficiency of date marketing – 37 per cent – is for retailers with a marketing scale of 10-50 tons and marketing objectives (Y2) and (Y3). Cost efficiency decreases from 69 per cent to 60 per cent when a retailer's date marketing objectives change to (Y2) and (Y3). Return to scale shows the necessity of increasing the marketing scale to increase date marketing efficiency. The lowest date marketing scale – less than 10 tons – has special characteristics of higher technical and cost efficiency regardless of the marketing objectives. Technical efficiency with variable return to scale is 100 per cent, and cost efficiency ranges between 93 per cent and 86 per cent, as seen in Table (2).

Table 2. Retailer date marketing efficiency in the Kingdom of Saudi Arabia at different market objectives

Marketing Objectives	**Efficiency Parameters**	**Date Marketing Scale (tons)**				
		>500	**100-500**	**50-<100**	**10-<50**	**<10**
Y1+Y2+Y3	TECRS	1	1	1	0.99	1
All 3 date marketing objectives	TEVRS	1	1	1	1	1
	Scale efficiency	1	1	1	0.99	1
	Return to scale	-	-	-	DRS	-
	Allocative efficiency	1	0.76	0.96	0.69	0.93
	Cost efficiency	1	0.76	0.96	0.69	0.93
Y1	TECRS	1	1	1	0.99	1
Y1=date quantity(tons)	TEVRS	1	1	1	1	1
	Scale efficiency	1	1	1	0.99	1
	Return to scale	-	-	-	DRS	-
	Allocative efficiency	1	0.7	0.96	0.69	0.88
	Cost efficiency	1	0.7	0.96	0.69	0.88
Y2	TECRS	0.43	0.78	0.51	0.37	0.4
Y2=Marketing margin (1000SR)	TEVRS	0.46	0.88	1	0.69	1
	Scale efficiency	0.93	0.89	0.51	0.54	0.4
	Return to scale	DRS	IRS	IRS	IRS	IRS
	Allocative efficiency	0.71	0.87	0.86	0.87	0.86
	Cost efficiency	0.33	0.76	0.86	0.6	0.86
Y3	TECRS	0.43	0.78	0.51	0.37	0.4
Y3=Ratio of marketing margin to marketing costs	TEVRS	0.46	0.88	1	0.69	1
	Scale efficiency	0.93	0.89	0.51	0.54	0.4
	Return to scale	DRS	IRS	IRS	IRS	IRS
	Allocative efficiency	0.71	0.87	0.86	0.87	0.86
	Cost efficiency	0.33	0.76	0.86	0.6	0.86

Source: Analysis of study data.

Figure 10 and Figure 11 showed, respectively, the marketing cost and technical efficiency for retailers at different marketing objectives.

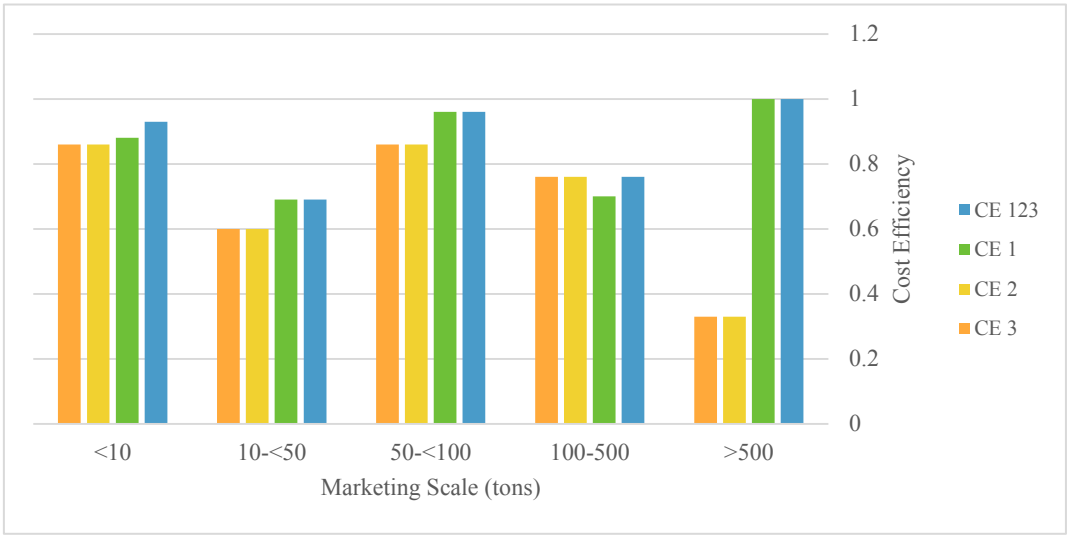

Figure 10. Retailer date marketing cost efficiency at different marketing objectives

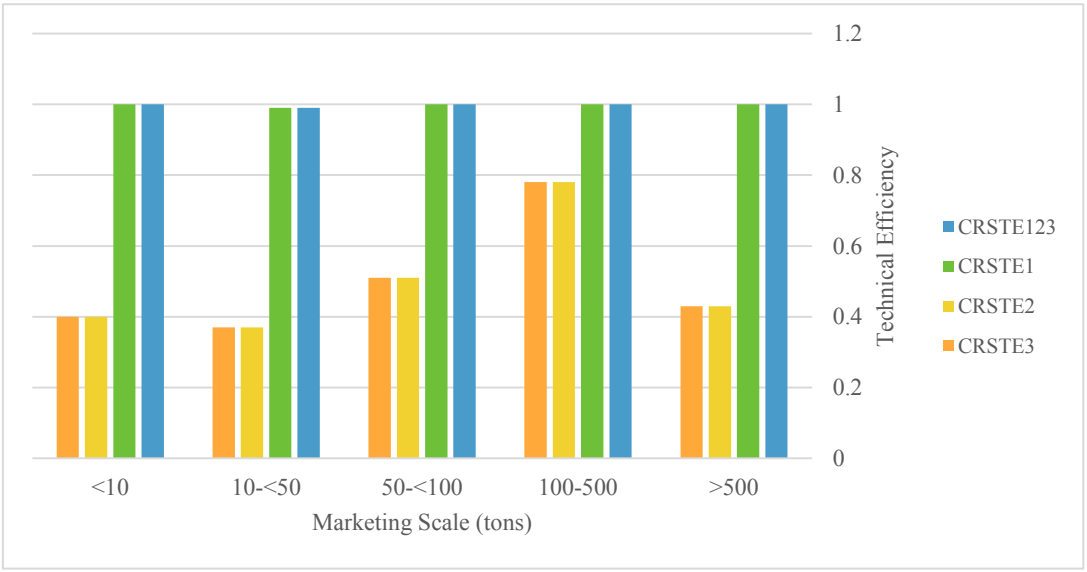

Figure 11. A retailer date marketing technical efficiency at different marketing objectives

3.2.3 Wholesaler and Retailer Date Marketing Efficiency

When a date trader works as both a wholesaler and a retailer simultaneously, this affects their efficiency compared one who works as wholesaler or retailer separately. The most efficient scale of date marketing is more than 500 tons a year, at which point all of the efficiency estimates reach the maximum of 100 per cent. Decreasing the date marketing scale decreases date marketing efficiency. The impact of date marketing objectives is clear, especially regarding a marketing scale of 10 - < 50 tons. The technical efficiency of date marketing decreases from 96 per cent and 93 per cent to only 30 per cent when the date traders changed their market objectives from (Y1+Y2+Y3) and (Y1) to (Y2) and (Y3), as seen in Table 3. At the same time, cost efficiency of date marketing decreases from 70 per cent to 65 per cent. This shows that the multiple objectives of the date trader will support their efficiency as long as they have more than one objective. Table 3 shows that wholesalers and retailers of date marketing with a scale of less than 10 tons a year – assuming a date marketing is a share among other crops – would increase date marketing efficiency to be close to 100 per cent. Figures 12 and 13 show the close relationship of the first and second date marketing objectives with technical and cost efficiency. Wholesalers and retailers must therefore adjust their marketing scale and target more than one objective to increase their marketing efficiency.

Table 3. Wholesaler and retailer efficiency of date marketing at different marketing objectives

Date Marketing Objectives	Efficiency Parameters	Date Marketing Scale (tons)				
		>500	100-500	50- <100	10 - <50	<10
Y1+Y2+Y3	TECRS	1	1	1	0.96	1
	TEVRS	1	1	1	0.97	1
	Scale efficiency	1	1	1	0.99	1
All 3 date marketing objectives	Return to scale	-	-	-	DRS	-
	Allocative efficiency	1	1	0.57	0.73	1
	Cost efficiency	1	1	0.57	0.7	1
Y1	TECRS	1	1	1	0.93	0.99
Y1=date quantity (tons)	TEVRS	1	1	1	0.95	1
	Scale efficiency	1	1	1	0.98	0.99
	Return to scale	-	-	-	DRS	IRS
	Allocative efficiency	1	1	0.56	0.74	0.96
	Cost efficiency	1	1	0.56	0.7	0.96
Y2	TECRS	1	0.72	0.35	0.3	0.39
Y2=marketing margin (1000SR)	TEVRS	1	1	0.6	0.7	1
	Scale efficiency	1	0.72	0.58	0.44	0.39
	Return to scale	-	IRS	IRS	IRS	IRS
	Allocative efficiency	1	1	0.86	0.93	0.96
	Cost efficiency	1	1	0.52	0.65	0.96
Y3	TECRS	1	0.72	0.35	0.3	0.39
Y3=Ratio of marketing margin to marketing costs	TEVRS	1	1	0.6	0.7	1
	Scale efficiency	1	0.72	0.58	0.44	0.39
	Return to scale	-	IRS	IRS	IRS	IRS
	Allocative efficiency	1	1	0.86	0.93	0.96
	Cost efficiency	1	1	0.52	0.65	0.96

Source: Analysis of study data.

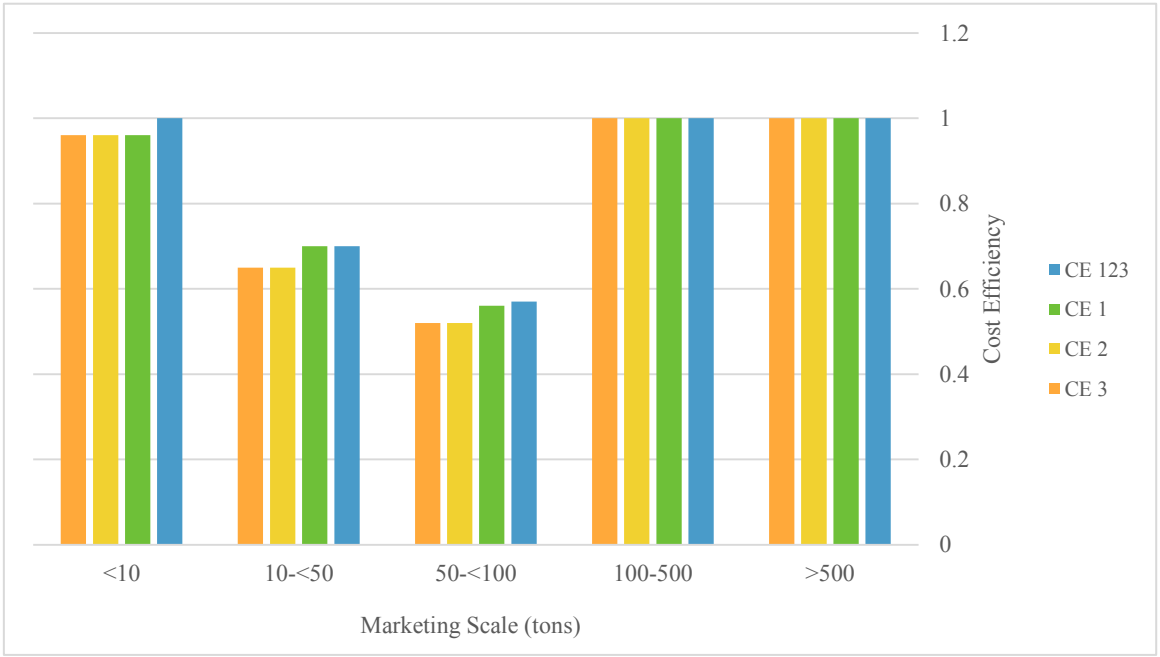

Figure 12. Wholesaler and retailer date marketing efficiency at different marketing objectives-cost efficiency

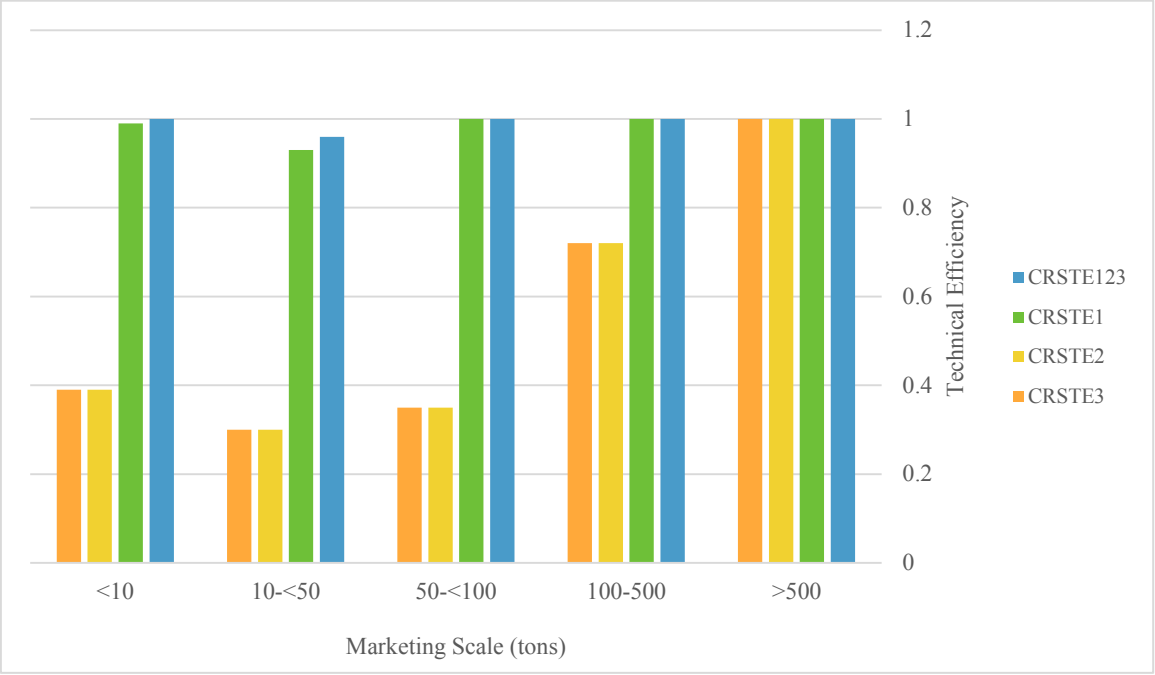

Figure 13. Wholesalers and retailers date marketing efficiency at different marketing objectives - technical efficiency

3.2.4 Wholesaler, Retailer, and Exporter Date Marketing Efficiency

When traders act as a wholesaler, retailer and exporter simultaneously, the scale of their date marketing increases, with none having less than 10 tons per year. In general, anyone with less than 10 tons per year is assumed to be active in other crop marketing activities as well as dates, although the efficiency of their date marketing will increase as their scale increases as the date trader becomes more professional and has more experience and resources to carry out their marketing functions in efficient ways.

Table 4 shows the differences among the technical, scale, and cost efficiencies regarding different date marketing objectives. All of the efficiency parameters of date marketing reach their maximum (100 per cent) when marketing scale is greater than 500 tons per year. The cost efficiency of date marketing is more sensitive to changes in date marketing scales and objectives. For example, when traders are welling to achieve the three marketing objectives simultaneously, the analysis showed that their cost efficiency will increase as their scale decreases; i.e., cost efficiency increased from 47 per cent to 94 per cent when the scale of the date marketing decreased from (500-100 tons) to (<50 -10 tons). This last result can be explained by traders marketing more crops than just dates.

The impact of marketing objectives on date marketing efficiency shows that technical efficiency –assuming constant return to scale – is at the maximum level of 100 per cent for all of the date marketing objectives except for marketing scale (<100 -50 tons) and marketing margins (Y2) and its ratio to marketing cost (Y3) where the technical efficiency of date marketing decreased from 100 per cent to 60 per cent. The results show that cost efficiency and date marketing objectives decrease from 47 per cent to 33 per cent at a marketing scale of (500 - 100 tons), as the date marketing objective changes from (Y1+Y2+Y3) to (Y1) only. A date marketing scale of (<50 - 10 tons) has a similar impact, with cost efficiency decreasing from 94 per cent to 57 per cent as date marketing objectives change in the same way. The technical and cost efficiency of date marketing are close in cases of marketing objectives (Y2) and (Y3).

Table 4. Wholesalers, retailers, and exporters efficiency of date marketing at different marketing objectives

Marketing Objectives	Efficiency Parameters	Date Marketing Scale (tons)				
		>500	100-500	50 - <100	10 - <50	<10
Y1+Y2+Y3	TECRS	1	1	1	1	0
	TEVRS	1	1	1	1	0
	Scale efficiency	1	1	1	1	0
	Return to scale	-	-	-	-	0
	Allocative efficiency	1	0.47	0.53	0.94	0
	Cost efficiency	1	0.47	0.53	0.94	0
Y1	TECRS	1	1	1	1	0
Y1=Date quantity(tons)	TEVRS	1	1	1	1	0
	Scale efficiency	1	1	1	1	0
	Return to scale	-	-	-	-	0
	Allocative efficiency	0.49	0.33	0.53	0.57	0
	Cost efficiency	0.49	0.33	0.53	0.57	0
Y2	TECRS	1	1	0.6	1	0
Y2=Marketing margin (1000SR)	TEVRS	1	1	0.76	1	0
	Scale efficiency	1	1	0.79	1	0
	Return to scale	-	-	IRS	-	0
	Allocative efficiency	1	0.47	0.68	0.94	0
	Cost efficiency	1	0.47	0.52	0.94	0
Y3	TECRS	1	1	0.6	1	0
Y3=Ratio of marketing margin to marketing costs	TEVRS	1	1	0.76	1	0
	Scale efficiency	1	1	0.79	1	0
	Return to scale	-	-	IRS	-	0
	Allocative efficiency	1	0.47	0.68	0.94	0
	Cost efficiency	1	0.47	0.52	0.94	0

Figure 14 and Figure 15 showed, respectively, the marketing cost and technical efficiency for traders working as wholesaler, retailer, and exporters simultaneously at different marketing objectives.

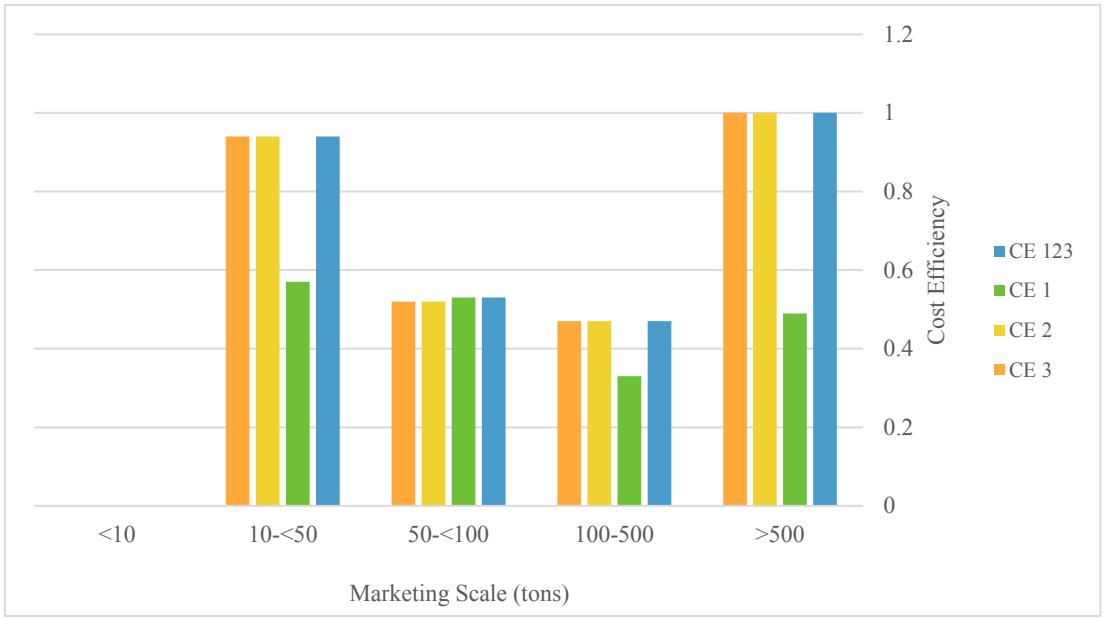

Figure 14. Wholesaler, retailer, and exporter at different marketing objectives- cost efficiency

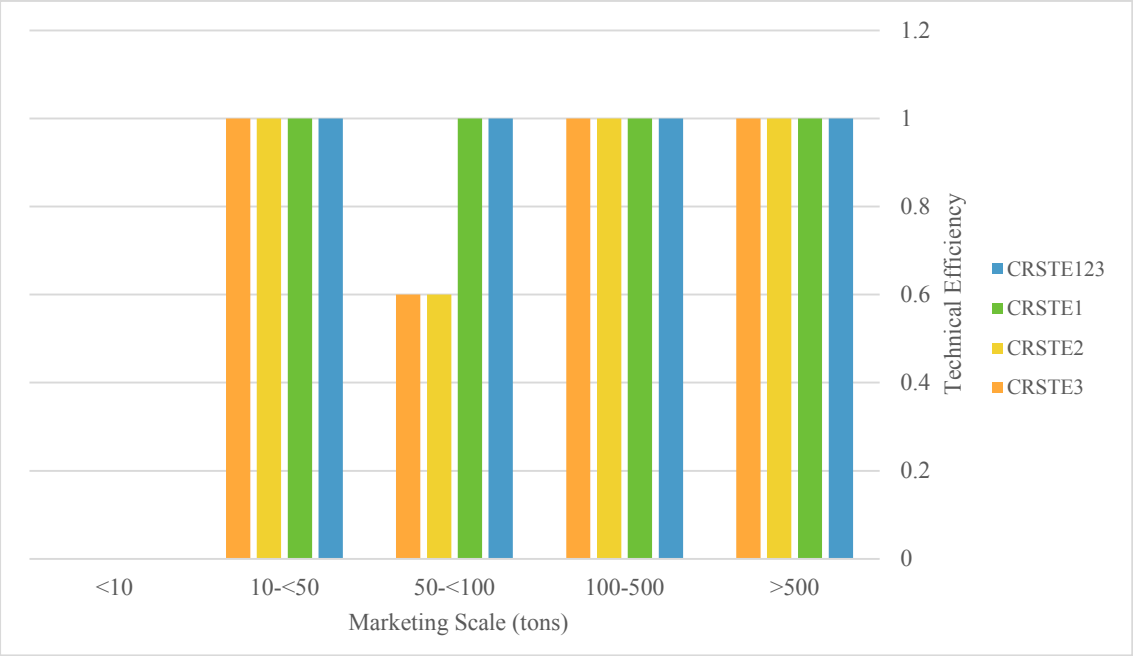

Figure 15. Wholesaler, retailer, and exporter at different marketing objectives- technical efficiency

3.3 The Impact of Improved Marketing Efficiency on National Income

The impact of improving date marketing efficiency was estimated on the basis of the calculated cost efficiency or economic efficiency (CE or EE) of date marketing in Saudi Arabia, assuming that DMUs' objective is to maximise the date marketing margin with an average CE or EE equivalent to about 49 per cent. This implies that there is potential to reduce the marketing costs of dates by about 49 per cent and to achieve the same level of marketing value added in the current state. In another words, DMUs can achieve an additional 51 per cent of value added or marketing margin once they reach full economic efficiency in date marketing.

Accordingly, improving marketing efficiency for all marketing and production elements employed in the date marketing value chain, starting from the farm gate until the final consumer, will trigger potential increase in value added by about 51 per cent from the current state. Improving date marketing efficiency will lead to a potential improvement in added value for market traders, including wholesalers, retailers, and exporters, in addition to the providers of marketing services. The estimated improvement in date marketing added value is about SR 6.88 billion per year, which represents the difference between the total return of date marketing, equivalent to about 22.65 billion SR per year at the current state of date marketing, to about 29.52 billion SR per year at the potential improved state of date marketing, out of which local market sales will contribute about 98 per cent of the total improved value added, as shown in Table (5). The estimated additional value added of the national date sector due to the improvement of marketing efficiency takes into account average date production in Saudi Arabia in 2011, and local consumption as well as and exported quantities which represented about 93 per cent and 7 per cent respectively of total annual production. The estimation also factored in the quantity lost or wasted of marketed dates, which represented about 4.6 per cent, equivalent to about SR 1,775.60 per ton.

Table 5. The potential impact of improved efficiency on national income

General Information	Units	Value
Total production 2011	Ton	1,008,105.00
local consumption 2011	Ton	933,308.00
Current State of Date Marketing	**Units**	**Value**
Weighted average lost date in all study areas	per cent	4.6
Weighted average lost date in all study areas	Ton	42,932.17
local consumption (minus) lost dates	Ton	890,375.83
Quantity exported	Ton	77,795.00
Weighted average selling price at retail level	SR/ton	24,215.00
Average export price	SR/ton	12,977.83
Weighted average date lost price	SR/ton	1,775.60
Return on local consumed dates	Billion SR	21.56
Return on exported dates	Billion SR	1.01
Return on lost dates	Billion SR	0.08
Total return	Billion SR	22.65
Improved State of Date Marketing	**Units**	**Value**
Estimated economic efficiency of date marketing	per cent	49
Potential economic efficiency improvement of date marketing	per cent	51
Average farm gate price (purchasing price at own farm level)	SR/ton	9,272.16
Estimated value added at retail price level (retail price - farm gate price)	SR/ton	14,942.85
Estimated value added at export price (export price - farm gate price)	SR/ton	3,705.68
Potential value added improvement for locally consumed dates	Billion SR	6.73
Potential value added improvement for exported dates	Billion SR	0.15
Total potential marketing value added improvement (potential impact with improved efficiency)	Billion SR	6.88
Total return with improved economic efficiency	Billion SR	29.52

3.4 Policies and Mechanisms

A set of policies and mechanisms were introduced to enhance the marketing efficiency and the competitiveness of the Saudi dates at the local and international markets. These introduced policies and mechanisms were classified into five sub sets as follows:

- **Strengthen institutional arrangements of date marketing through:**
  - Identifying and empower a national date market maker to lead, oversee, regulate and coordinate the efforts of the relevant national intuitions.
  - Promoting the establishment of small and medium enterprise companies (SMEs) to carry out the pre and post-sale marketing services efficiently.
  - Developing infrastructure for e-trade, and completing its necessary systems and regulations.
  - Strengthen the role of the main authorities and their subsidiaries related to local and international date marketing, and coordinate their efforts.
  - Strengthen the role of R&D institutions in advancing the date marketing value chain.
- **Build the manpower capacity and qualification through:**
  - Developing a long-term strategic plan to overcome the difficulties of manpower rehabilitation.
  - Establishing business incubators for young people in the date industry including farmers' services, marketing, packaging, sales, logistics, shipping, and cold storage.
  - Training young Saudis via specialised training to undertake the implementation of farm business.
- **Promote date exports including trademark through:**
  - Establishing quality trademarks for Saudi dates.
  - Raising awareness of Saudi exporters about standards and specifications of targeted international markets.
  - Developing partnerships with local suppliers in target countries to ease the export of Saudi dates.

- Establishing specifications and standards for Saudi dates consistent with international requirements.
- Strengthen regulatory systems and laws related to safety, food security and date standards.

- **Provide appropriate financing and venture capital through:**
  - Establishing a venture capital fund to support the activities of date marketing locally and globally
  - Expanding lending for marketing activities on concessional terms.
  - Financing promising investment opportunities in date marketing.
  - Supporting specialised agricultural cooperative societies via financing programs and facilities to activate its role in the definition of Saudi dates abroad.

4. Conclusion

In conclusion, this research paper analysed the current state of the date marketing efficiency in the Kingdom of Saudi Arabia and assessed the potential impact of the improved marketing efficiency on the economic returns of marketing channels and the national income. In addition, this research paper introduced a set of policies and mechanizes to improve the marketing efficiency of dates and to enhance the competitive advantage of Saudi dates at local and international markets.

Acknowledgment

The authors of this research paper is very grateful to King Abdulaziz City for Science and Technology (www.kacst.edu.sa) of the Kingdom of Saudi Arabia for its financial support and continuous encouragement. The paper was funded through the Strategic Technology Program – the National Plan for Science, Technology, and Innovation (http://maarifah.kacst.edu.sa) grant # 600-32.

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