The Management of Change within Maritime Clusters

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Maritime clusters have come to be understood as important compositions for many regions, as they seem to exemplify the breeding ground of regional and even, national competitiveness. As with other cluster types, the relational characteristics and dynamics of maritime clusters foster knowledge creation and innovation. As such, they have provided symptomatic interest, for many domains relevant to research and practice, alike. Strategy and policy are indicative within the former and both regard the management of change as bearing paramount importance. Therefore, it would be relevant to create instruments for the management of change within maritime clusters. Through this work, a framework for change management of maritime clusters is formulated, based on the change quadrants framework. It can provide a facilitator towards more effective strategic management and policy formulation for maritime clusters. The instrument can be used by practitioners and simultaneously it may provide the kindling for further research.

Keywords: *strategic management, change management, cluster policy, industry cluster, crosstabulation, change quadrants.*

1. INTRODUCTION

Clusters of industry consider a constellation of firms, agencies, and institutions that share relational capacity, to an indicative extent. This relational capacity drives societal dynamics of these cluster members towards collective excellence that can benefit regional and even national economies. A major driver of this effect is innovation as it's rooted within the rudiments of clusters [1]. Other characteristics of clusters include knowledge creation and management that turn into sustainable competitiveness for the cluster members [2]. All these effects provide a viable base for the development of many research frameworks [3]. An interesting instance within cluster research, includes the investigation of causality between two factors, as can be exhibited within much of the literature.Onefactorthat manifests prevalence within the research is spatial clustering. It can be correlated within organizational learning to inquire its bound effect towards innovation [4], or its sole effect on entrepreneurship [5].

Many other pairs of factors are investigated within the literature. These may include the causal effect of networks on innovation [6]; the effect of support services and social (and venture) capital, on the initiation of an entrepreneurship culture [7]; and the causality of location patterns with reference to innovation [8]. As innovation stands as a major factor of interest for clusters, research has documented that it does indeed bear a causal relationship with the proximity of firms to a cluster [9]. Other factors researched can include clusters situated in developing countries, with reference to technology and systems of knowledge [10]; the matter of knowledge can be researched with respect to the causality of the flows of knowledge and the system of contacts [11]. Research extracts point to the fact that entrepreneurship may be linked with the presence of a cluster, as well [12]. In addition, knowledge creation and management can have an indicative effect on the system of innovation within a cluster [13].

The first to provide a model on centralization that provides semblance to a cluster, was the father of location theory, von Thünen [14]. One of the first of the neoclassical economists, Alfred Marshall [15], has extended the theory by providing relevant agglomeration economies, that bear the causal effect of a cluster's competitiveness. These factors are analysed in modern theory, as well. The latter includes a strong interest with reference to the contributions of M. Porter [16], that contain research on the origin of competitiveness, along with the diamond model, that can be used to analyse the competitive position of a cluster. As can be extracted from the literature, clusters are important constructs for regional and national economies, as their networks of members fuel knowledge creation and innovation that can drive regional competitiveness. As such, policy and strategy are important elements for clusters, as they both can facilitate the management of change, that is imperative in nearly all instances of knowledge creation, innovation, and competitiveness.

Strategic management is important for the research of clusters, as well [17]; to the extent that the effectiveness of the strategic decisions within the cluster will hold a direct and causal relationship with competitiveness [18]. In addition, strategic management can affect performance [19] and have an impact on trust

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between the cluster members; the former is also an important aspect, found inherent within the network of cluster actors[20]. Not only this, but future research can delve into the subject, as it holds indicative potential [21]. It is important to mention that strategy and policy are not divergent, but correlated cluster aspects [22]. The domain wherein cluster research is situated can portray diversity; it includes economic geography, location theory, strategic management, and organisa–tional theory [23].The contributions of cluster research, paired with strategic management, can impact not only strategic decisions within firms, but concepts that affect other sectors, including the environment [24].

Strategic management research can assist the documentation of many topics, such as cluster evolution [25], wherein the relational dynamics of clusters and their impact on innovation can be investigated [26]. The organizational structures within the research referring to these factors and concerning change management, can be very important [27]; all the way to the regional management of change with respect to the industry clusters of the district [28]. As the development of strategic management frameworks that can assist the management of change is a developing and dynamic domain, this work provides a novel framework that can facilitate the management of change within maritime clusters. The latter are a type of clusters that can be considered indicative, as their impact on regional economies is grave.

2. STRATEGIC MANAGEMENT WITHIN MARITIME CLUSTERS

The factors presented above, with reference to innovation and entrepreneurship, can be analysed very effectively within maritime clusters [29]. The latter provide benchmarks for strategic management research [30]. As expected, competitiveness within maritime clusters can be affected and carved by effective strategy and policy [31]. Research focuses on the potential and capacity of cluster formulation [32], employment [33], and governance [34], as topics affected by the presence of a maritime cluster. Again, these clusters bear an exemplary effect upon innovation, social capital [35], and competitiveness [36]. Researching maritime clusters can have a diverse scope, inspecting even the most preliminary facts within the theory [37]. In addition, maritime clusters provide the ground for the development of frameworks [38] and models [39].

As with many other types of clusters, the dynamics of cooperation and competition within maritime clusters will influence innovation, competitiveness, and performance [40], in addition to the creation of value [41]. Many outcomes from the strategic domain, such as alliances within and among maritime clusters, will affect regional and even national competitiveness [42]. The intricacies of maritime cluster dynamics can be documented through the utilization of many theories [43]. The use of models can explain many maritime cluster characteristics, such as their evolution [44]. As it is accepted that strategy and policy may be intertwined, policy exhibits itself as an important factor of maritime clusters [45] and, in addition, their evolution can be investigated using typologies [46].

Research into topics concerning maritime clusters can utilize qualitative and quantitative methodologies and contribute within the domain of strategic management [47]. This can include the impact of regional strategies within maritime clusters [48]. Many factors of importance for all cluster types surface as same for maritime clusters, as well. These include innovation [49], policy, and governance [50]. Research models can assist the selection of effective policy [51] and the sustainability of competitiveness can be impacted by culture (both the cluster's and its members'), within a maritime cluster [52]. Again, the dynamics of cooperation and competition are very important for the management of strategy [53] and the research instruments formulated can have many and diverse applications [54].

As maritime clusters hold distinct potential with reference to strategy and policy and simultaneously the development of frameworks for these constructs can be quite beneficial, one may wish to develop frameworks for the management of change within maritime clusters, as these may stand to benefit both domains of interest. Within this field, the extension of applicability of effective instruments can prove to be quite pertinent. A framework that is very important for change manage–ment is the change quadrants framework. Within this work, the latter is induced through a quantification prism, insofar that succeeding cross-tabulation and relevant statistical decision tests may be administered, so that it can be used effectively for the strategic management of maritime clusters.

3. THE CHANGE QUADRANTS FRAMEWORK AND ITS IMPACT ON STRATEGIC MANAGEMENT

Within the diverse domain wherein one may locate instruments for the management of change, the change quadrant framework stands out [55]. The basis ofthe framework consists of two categorical variables, that are dichotomous. One variable refers to the internal environment, where the other to the external (Figure 1).

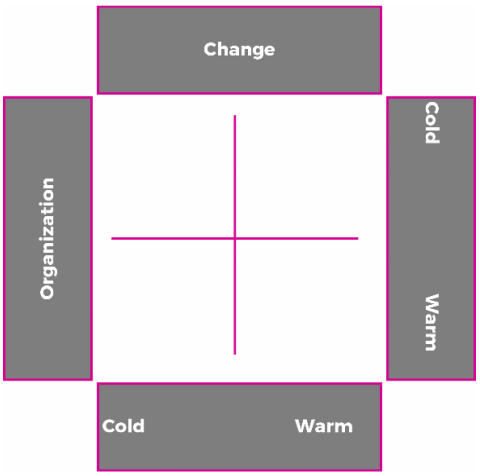

Figure 1. The framework of the change quadrants.

These variables can belong in one of two states, either 'hot' or 'cold.' The four possible combinations of

the two states of the variables can procure the four different strategies one may implement, with respect to the management of change. With reference to the variable of the internal environment, a 'cold' organization is described as one where procedure will dictate direction. A 'warm' organization will use its shared culture to determine its direction. With respect to the second variable, that of 'change,' a 'cold' motivation for change will have an external origin based usually on the firm's fundamentals. A 'warm' change will include the materialization of corporate vision. The four states of the framework will extract different strategies to be implemented. Within these four possible strategies, one must eitherintervene (cold motivation for change in a cold organization), transform (warm change in a cold organization), implement (cold change in a warm organization), or innovate (warm motivation for change within a warm organization, Figure 2).

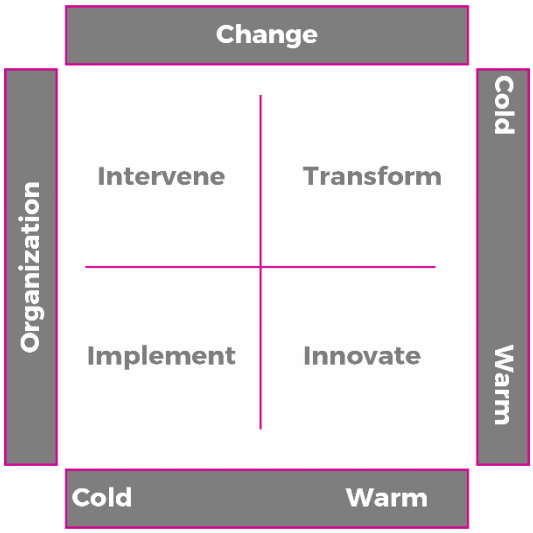

Figure 2. The types of change strategies.

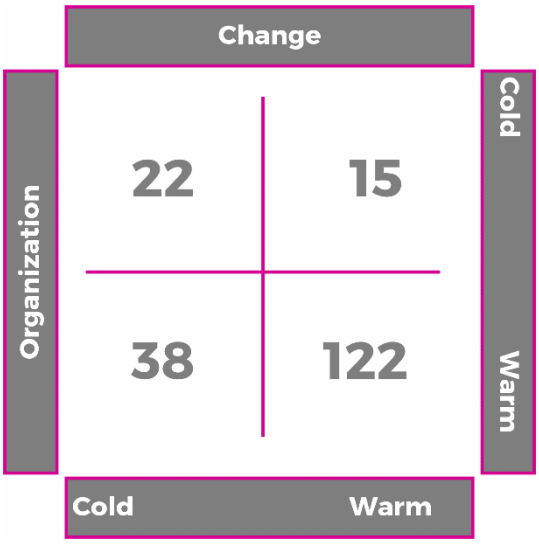

Figure 3. Compilation of the change quadrants crosstab.

As mentioned, a quantification aspect within the instrument can be introduced. The latter will give way to the investigation of causality between the variables, that is very important for maritime clusters. The first step toward developing this model would be to perform the preliminary analysis with respect to representing the cases that fall within each state of the change quadrants framework. Through the numeric representation of the cases within the maritime cluster that fall into these categories, asimple crosstab would be compiled, as in Figure 3. This includes a generation of random numbers, for the purposes of demonstrating the model. As a subsequent step, one may calculate the joint, marginal, and conditional probabilities (Table 1).

Table 1. Joint, marginal, and conditional probabilities of the devised case (source: authors, SPSS™ output).

			Change		Total
			yes	no	
Organization	yes	Count	22	15	37
		Expected Count	11.3	25.7	37.0
		% within Organization	59.5%	40.5%	100.0%
		% within Change	36.7%	10.9%	18.8%
		% of Total	11.2%	7.6%	18.8%
	no	Count	38	122	160
		Expected Count	48.7	111.3	160.0
		% within Organization	23.8%	76.3%	100.0%
		% within Change	63.3%	89.1%	81.2%
		% of Total	19.3%	61.9%	81.2%
Total		Count	60	137	197
		Expected Count	60.0	137.0	197.0
		% within Organization	30.5%	69.5%	100.0%
		% within Change	100.0%	100.0%	100.0%
		% of Total	30.5%	69.5%	100.0%

The collection of probabilities themselves, can introduce a novel analytical aspect that can benefit the management of change within maritime clusters, as research and practice now hold a strong quantitative instrument that can document the proper change strategies to be implemented. Through this model, these strategies derive from a robust methodology. Within the cross-tabulation of the change quadrants, a modelling approach is introduced and through this, an arsenal of analytical instruments may be administered. The aspect of quantification introduced to the change quadrants framework through the cross-tabulation of its variables can bear indicative effect to the analysis, as the structured and robust methodology introduced can usher a novel analytical domain for the instrument. By extension, the modelling approach can not only extend the analytical scope through the procurement of the typology of probabilities, but also introduce the investigation of causality among the categorical variables of the change quadrants; a potential element that can provide indicative results for the strategic management of maritime clusters.

Table 2. Causality investigation for the change quadrants (source: authors, SPSS™ output).

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	18.092[a]	1	.000		
Continuity Correction[b]	16.445	1	.000		
Likelihood Ratio	16.808	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	18.000	1	.000		
McNemar Test				.002[c]	
N of Valid Cases	197				
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.27.					
b. Computed only for a 2x2 table					
c. Binomial distribution used.					

For a given level of significance (for the analysis included herein it is selected asα=5%), one can select one of two interpretations with reference to the samples included in the change quadrants. The first concerns paired samples and will lead to the utilization of McNemar's test. Rejection of the null hypothesis of marginal homogeneity will reject the hypothesis of equality of the marginal probabilities of the cross-tab and thus, point to variables' causality. If the distinction of unpaired samples is selected, then Pearson's chi-squared test may be administered. Here, the null hypothesis of independence will provide statistical significance hinting to variables' causality, if rejected. The results of the devised case are included in Table 2.

Table 3. Estimates of risk (source: authors, SPSS™ output).

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Organization (yes / no)	4.709	2.223	9.974
For cohort Change = yes	2.504	1.704	3.678
For cohort Change = no	.532	.357	.793
N of Valid Cases	197		

Both for the consideration of paired and unpaired samples the statistical hypothesis tests move to reject the null hypothesis, given that both p-values are equal to, or nearly zero (and lower that α=5%).Therefore, for the case presented herein, both types of samples would hint to variables' causality. This type of result can have major effects in the management of change within a maritime cluster and it was all extracted through the crosstabulation of the change quadrants framework. It is evident that, through this methodology, not only is the initial usability of the change quadrants not hindered, but its applicability extended and offered novel insight that can prove beneficial to any analysis concerned with variables' causality within maritime clusters.

Not withstanding, another analytical aspect that can surface through cross-tabulation, is the calculation of risk (Table 3). The statistical hypothesis tests can provide a dichotomous answer with respect to variables' causality, whereby risk analysis can provide a level of representation for causality. For the case presented here, the odds ratio is over 4.7, hinting that there are over 4.7 times greater odds for a warm motivation for change to take place in a warm organization in the maritime cluster, to the odds of a warm motivation for change occurring in a cold organization. In the same manner, the risk ratio is calculated at over 2.5, indicating that a probability of a warm motivation for change is over 2.5 times likely to occur in a warm organization than a cold one. These results can be very important for both the change quadrants framework and the management of strategy within a maritime cluster and can be included within the broad range of research that is concerned with the topics of sustainability [56] and optimization [57].

4. CONCLUSIONS

Clusters of industry are very important for the regions wherein they are situated, as within them there seem to bloom indicative constellations of networks that promote knowledge creation and innovation towards regional and national competitiveness. Within all types of clusters, there are many that are considered indicative. Among the latter, one can include maritime clusters, as they have a grave impact on the economies wherein they are situated. At the same time, research into these types of clusters can include an array of topics, that include strategy and policy.

The development of frameworks for the management of strategy and policy within maritime clusters is highly consequential and prevalent, as instruments can facilitate the effective management of these domains, both for research and practice. An element that affects both strategy and policy, is the management of change. A framework of importance within this domain is the change quadrants framework, that can be indicatively effective for strategic management within maritime clusters. The former is cross-tabulated, and thus a model is introduced, that extends the applicability of the generic change quadrants framework. Through this, many novel analytical directions for the management of strategy and policy within maritime clusters can be pursued.

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УПРАВЉАЊЕ ПРОМЕНАМА У ПОМОРСКИМ КЛАСТЕРИМА

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Поморски кластери се све више прихватају као важна компонента многих региона јер изгледа да представљају пример плодног тла за развијање регионалне, па чак и националне конкурентности. Као и код свих типова кластера, карактеристике повезаности и динамика поморских кластера подстичу развијање знања и иновативности. Као такви, ови кластери су изазвали интересовање за многе домене који су од подједнаког значаја за истраживања и праксу. Стратегија и политика су карактеристични за науку и сматрају да је управљање променама од највећег значаја. Према томе, израда инструмената за управљање променама у поморским кластерима била би од користи. Рад формулише оквир за управљање променама у поморским кластерима, који се заснива на квадрантима промена. Такав оквир за поморске кластере олакшава пут ка ефикаснијем стратешком управљању и формулисању политике. Инструмент могу да користе практичари, али истовремено и истраживачи.