

The Analysis of Maintaining Biodiversity, Integrated Coastal Zone Management and Environmental Impact Assessment for Marine Spatial Planning

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Abstract

The article wants to realize what relatively important keywords among marine spatial planning (MSP) whether are really workable, disguise of political interest or excuse for ambiguous policy. It had literature review including international journal, UNESCO document and domestic related regulations for 10 keywords. The results indicate male, female, elder age ≥ 40 and young age ≤ 39 what have same top 3 keywords Maintain Biodiversity, Integrated Coastal Zone Management (ICZM) and Environmental Impact Assessment (EIA) respectively. Meanwhile, it conducted statistical tests within confidence interval 95% are significantly different from 10 keywords. Restarting discarded plant will pollute air and construct coal dock within 3 miles Protection Zone endangering biodiversity loss. Not only finding conflicts between ecological conservation and plant exploitation but provides effective plans for problem solution. The plan 1 maintaining biodiversity establishes underwater museum and associates with virtual reality technology in place of plant at same site for preventing pollution and activating idle asset. Plan 2 performs ICZM, creates aquaculture incubation at site of estimated coal dock and associates traditional fish port, Touristy Fish Port with Marine Museum Scientific and Technology for ecotourism. Plan 3 implements comprehensive EIA, upgrades current LPG (Liquefied Petroleum Gas) to LNG (Liquefied Natural Gas) renewable energy. Human cannot prevent natural disaster happening such as earthquake but can alleviate adverse impact and adopt adaptive strategy. All above plans are good examples for maintaining biodiversity, ICZM and EIA through MSP.

Keywords: Maintain Biodiversity; Integrated Coastal Zone Management; Environmental Impact Assessment; Marine Spatial Planning; Ecosystem Based Management; Precautionary Measure; Renewable Energy

Introduction

Maintain Biodiversity, Integrated Coastal Zone Management (ICZM), Environmental Impact Assessment (EIA) are the top 3 keywords after calculated total 30 respondents about questionnaire of 10 keywords and they are no different from gender and age respondents after conducted statistical test within confidence interval 95% which is the first part of this article. In reality, conservative community of fish port is in the face of maintaining biodiversity and restarts discard plant with coal dock establishment, which will pollute air and violate regulations of EIA and ICZM. However, it always specifies through politic process in the world. Even though, the 2nd part of article concentrates maintaining biodiversity, ICZM, EIA and proposes 3 marine spatial plans for the controversial issue between conservation and exploitation.

A multitude of uncoordinated activities resulted in irreversible loss and substantial damage biodiversity such as habitat loss, use-environment conflicts. There were not all uses with compatibility, competing for ocean space or had adverse impact one another as use-use conflicts, shipping, offshore wind farms and significantly reducing the loss of biodiversity of coastal ecosystems [1]. Marine Spatial Planning (MSP) is the science for assessing, communicating tradeoffs among uses of ocean and identifying strategies to catch up policy opportunities from efforts to implement ecosystem-based management (EBM) [2]. It can be used as a tool reducing conflict and find compatible uses of ocean and coastal space [3]. The rational planning follows universal principles and steps presenting alternative perspective that are highly differentiated and place-specific [4]. MSP pursued essential tool for achieving marine and coastal conservation. If it lacks consideration of social data, values and preferences resulting in poor decision, may exacerbate conflict [5]. Integrated Coastal Zone Management (ICZM) was expected to

lead coastal communities developing economies and brought areas of life by managing natural resources in a sustainable approach [6]. Decision maker requires Environmental Impact Assessments (EIA) for habitats and ecosystems to understand human activity in marine areas, particularly facing global change [7]. Marine Protection Area (MPA) creates a dangerous illusion of protection when no protection is occurring [8]. The precise spatial allocation helps balance at high competition for limited marine space among sectorial interests [9].

This article describes current scenario of marine management, expects to effectively control development, forecasts progress and further achieves objectives. It intends to raise awareness about human activities resulting in degradation ecosystem and focuses how proceed compatibility with economic, social culture, environment protection and sustainable development of renewable energy. Sustainable development means satisfying contemporary needs simultaneously without sacrificing ability of future generations to satisfy their needs [10]. In order to identify priority of policy enforcement for marine environment protection whether gender has significantly different about coastal management for sustainable development. The concrete scientific evidence with statistic supports comments, the article established 10 categories of marine environment after had literature review including

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international journal, UNESCO, Convention, domestic legislation, regulations and community economic development. It is easily identified the top 3 categories are Maintain Biodiversity, Integrated Coastal Zone Management (ICZM) and Environmental Impact Assessment (EIA) after each participant has 5 votes to cast among 10 categories as mentioned in Tables 1 and 2.

Material and Methods

Engaging conservation and stakeholders in scientific process can be incredibly valuable, in terms of hypothesis generation and validation as actual knowledge production [11]. Many countries

has been implementing ICZM as a means to promote sustainable use, development and protection of coastal environments [12].The Convention on Biological Diversity (CBD) describes ecosystem approach as an integrated strategy management of land, water and living resources that equitably promotes conservation and sustainable use [13]. An analytical tool for assessing spatial conflicts and synergies among sectors, coastal conservation plan is formulated by ICZM [14]. The sustainable development of EIA and ICZM are a global trend and important issue in the future [15].

Everyone recognizes marine environment is very important but has no concrete statistics to support the comment. The article

No	Marine or Non-Marine	Gender	Age	Age Group	Married	Education	Maintain Biodiversity	Offshore Windfarm	Marine Ecotourism	Marine Spatial Planning	Integrated Coastal Zzone Management	Environmental Impact Assessment	Marine Museum in Virtual Reality	Information Application	Promote Marine Education	Aquaculture with Digital Application
1	Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v			v	v	v				v
2	Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v		v	v	v	v				
3	Marine	Female	40-59	≥ 40 (Elder)	Yes	Graduated	v	v	v	v					v	
4	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v	v		v		v			v	
5	Marine	Male	19-39	≤ 39 (Young)	Yes	Graduated	v									
6	Non-Marine	Male	19-39	≤ 39 (Young)	No	Graduated		v	v							v
7	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v			v	v	v			v	
8	Non-Marine	Male	19-39	≤ 39 (Young)	No	Graduated	v	v		v	v	v			v	
9	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v		v		v		v		v	
10	Marine	Male	>60	≥ 40 (Elder)	Yes	Graduated	v			v	v	v			v	
11	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v			v	v	v				v
12	Non-Marine	Male	19-39	≤ 39 (Young)	No	Graduated	v	v	v		v	v				
13	Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v		v	v	v	v				
14	Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v				v	v		v		v
15	Marine	Male	19-39	≤ 39 (Young)	No	Graduated	v			v	v			v	v	
16	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v	v		v	v	v				
17	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v	v	v		v	v			v	
18	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated					v	v		v	v	v
19	Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated			v	v	v		v	v		
20	Non-Marine	Female	40-59	≥ 40 (Elder)	Yes	Graduated	v			v	v	v			v	
21	Non-Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v		v			v			v	v
22	Non-Marine	Female	40-59	≥ 40 (Elder)	Yes	Graduated	v		v		v	v			v	
23	Non-Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v		v		v	v			v	
24	Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v	v	v	v	v	v	v	v	v	v
25	Non-Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v	v	v	v		v			v	
26	Non-Marine	Female	19-39	≤ 39 (Young)	No	Graduated	v		v	v	v				v	
27	Non-Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v	v			v	v			v	
28	Non-Marine	Male	40-59	≥ 40 (Elder)	Yes	Graduated	v		v	v	v	v				
29	Marine	Female	40-59	≥ 40 (Elder)	No	Graduated	v			v	v	v			v	
30	Non-Marine	Male	19-30	≤ 39 (Young)	No	College or underground	v			v	v	v				v

Remarks: No 5 selected 1 keyword only; No 6 selected 3 keywords; No 17 selected 6 keywords; No 24 selected 10 keywords; No 25 selected 6 keywords

Table 1: Total 30 responses include 18 males and 12 females.

S No	Keyword	Male	Female	Age ≥ 40 (Elder)	Age ≤ 39 (Young)	All Age	Gender
1	Maintain Biodiversity	15	12	14	13	27	27
2	Integrated Coastal Zone Management (ICZM)	14	10	13	11	24	24
3	Environmental Impact Assessment (EIA)	13	10	13	10	23	23
4	Marine Spatial Planning (MSP)	9	9	10	8	18	18
5	Promote Marine Education	10	8	12	6	18	18
6	Marine Ecotourism	7	8	7	8	15	15
7	Offshore Windfarm	7	3	5	5	10	10
8	Aquaculture Associated with Digital Application	5	3	3	5	8	8
9	Information Application	3	2	2	3	5	5
10	Marine Museum in Virtual Reality	2	1	2	1	3	3
	Total	85	66	81	70	151	151

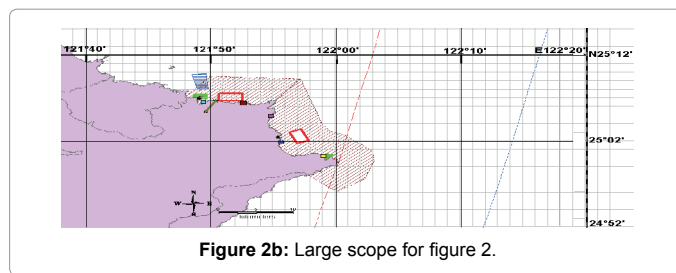
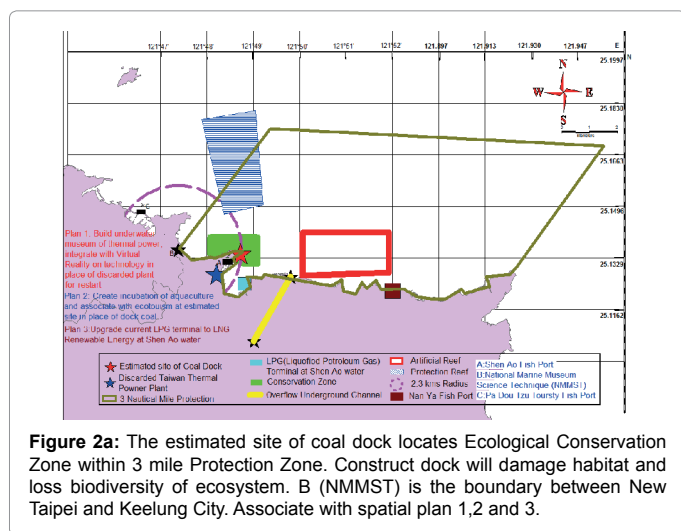
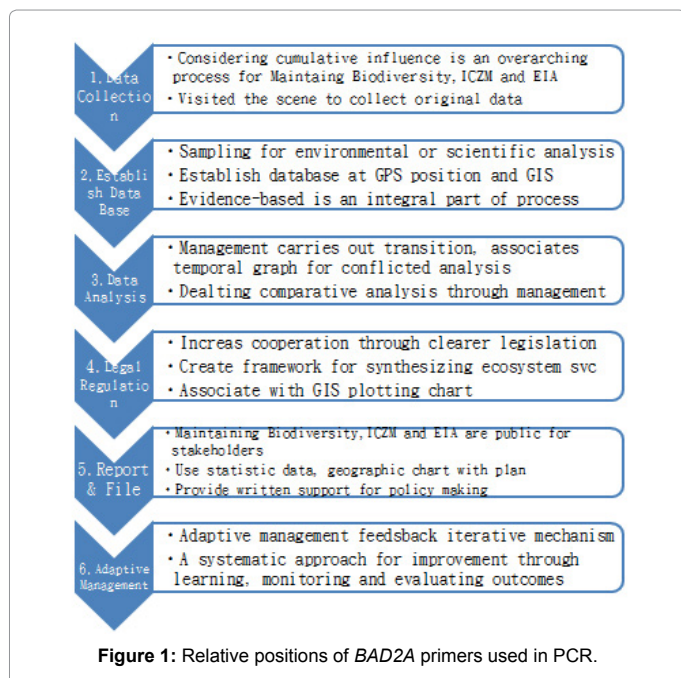
Remarks: Each respondent had 5 keywords selections × 30 respondents=150 selection; Male has total 85 selections; Female has total 66 selections; Total 151 selections

Table 2: The total 30 respondents recognize top 3 keywords Maintain Biodiversity, ICZM and EIA.

tries to identify current global trends and specifies 10 keywords after had literature review including international journal, UNESCO documents, Convention, Transition Regulation of State Energy, Domestic Legislation, Community Development and Ecosystem Conservation. The total 30 response including 18 males and 12 females from mostly graduated students as Table 1. A schematic representation of the complete methodology is illustrated in Figure 1. The writer visited the scene, collected data of location with longitude, latitude at app of Global Position System (GPS) from smart phone and exercised scientific roadmap in proceeding verification, found problems and studied solution as Figure 2a and 2b.

Questionnaire

1. Stakeholders provide better understanding of issues and conflicts through participation of management plans. Public communication tool increases transparency and collaboration in MSP process through involvement of stakeholders [9].



2. Please take your 30 seconds and tick 5 relatively important subjects from following 10 keywords for further analysis:
3. Marine Spatial Planning (MSP); Integrated Coastal Zone Management (ICZM); Environmental Impact Assessment (EIA); Maintain Biodiversity; Aquaculture Associated with Digital Application; Offshore Wind farm; Marine Ecotourism; Marine Museum in Virtual Reality; Information Application; Promote Marine Education
4. The 30 respondents of Table 1 are students from 3 departments of National Taiwan Ocean University. The first is Department of Environmental Biology and Fisheries Science. Second is Institute of Applied English and third is Department of Shipping & Transportation Management. Most of them are graduated students whose careers covering teachers at elements school, police, officer of Coast Guard, shipping managers and temporary workers at local administration.

Data collection

Data collection for expounding, analyzing and criticizing is the fundamental process of research. Strategic plan of data collection enhances process of decision making, which clearly depicts tradeoff between existing status and integrated measure, simultaneously leads clearest and least ambiguous set of objectives [16]. The article visited relevant scene to collect original data, fix position in latitude and longitude. A written report is provided by Geographic Information System (GIS) plotting map with all relevant location, makes plan for problem solving on social contribution through comparative analysis at Figure 2a. The ecological conservation paves the way for EBM and proposes alternative plan for sustainable development, which widely collects data and information for EIA before finds solution dealing with problems.

Table 2 indicates male 85 selection, female 66 and total 151 selection which the top 3 keywords Maintain Biodiversity, ICZM, EIA are all the same for Male, Female, age ≥ 40 elder and ≤ 39 young.

Table 3 t-test indication t statistics 0.568 is less than Critical Value 1.739 and the P value one tailed 0.288 is larger than alpha level 0.05. What means elder age ≥ 40 and young age ≤ 39 is no significant difference from 10 issues. It has no gap generation. Then, taking reference contents of Table 2 proves the results of Table 3.

Table 4, t-test indication t statistics 1.00 < critical value 1.7340 and P value 0.1652 is larger than alpha level 0.05 what means male and female are no significant difference from 10 keywords. Then, taking reference contents of Table 2 proves the results of Table 4.

The Table 5, the variance of age ≤ 39 at 13.77 is the smallest which meaning is relatively non diverse among age ≥ 40, male and female. On the contrary, the age ≥ 40 variance at 23.65 is relatively diverse among age ≥ 39, male and female. Meanwhile, the values of mean and mode

	Age ≥ 40 (Elder)	Age ≤ 39 (Young)
Mean	8.1	7
Variance	23.65555556	13.77777778
Number of Observation	10	10
Assumed Mean Error	0	
Degree of Freedom	17	
t Statistics	0.568543154	
P(T ≤ t) one tailed	0.288550144	
Critical Value: one tailed	1.739606726	
P(T ≤ t) two tailed	0.577100288	
Critical Value: two tailed	2.109815578	

Table 3: Table 3: The t test of elder age ≥ 40 and young age ≤ 39 for 10 keywords.

	18 Male	12 Female
Mean	8.5	6.6
Variance	20.5	15.6
Number of Observation	10	10
Assumed Mean Error	0	
Degree of Freedom	18	
t Statistics	1	
P(T<=t) one tailed	0.165282466	
Critical Value : one tailed	1.734063607	
P(T<=t) two tailed	0.330564931	
Critical Value : two tailed	2.10092204	

Table 4: The t test of Male and Female.

Summary	Male	Female	Age ≥ 40 (Elder)	Age ≤ 39 (Young)
Mean	8.5	6.6	8.1	7
Standard Error	1.4317821	1.249	1.538036266	1.173787791
Median	8	8	8.5	7
Mode	7	10	13	8
Standard Deviation (SD)	4.5276926	3.949684	4.863697725	3.711842909
Variance	20.5	15.6	23.65555556	13.77777778
Kurtosis	-1.235886	-1.71555	-1.9411682	-0.637087483
Skew	0.0673363	-0.24994	-0.133850807	0.032589672
Range	13	11	12	12
Min	2	1	2	1
Max	15	12	14	13
Sum	85	66	81	70
Data	10	10	10	10

Table 5: The summary of different variance.

indicate no significant difference among male, female, age ≥ 40 and age ≤ 39.

The Table 6 Chi Squared value 21.27 is larger than critical value 16.919, degree of freedom (DF) 9, critical criteria 0.05 and P value 0.011 is less than alpha level 0.05. Thus, hypothesis is rejected what means female respondents at equal importance for 10 keywords are rejected. They focused on top 3 keywords Maintain Biodiversity, ICZM and EIA.

The Table 7, Chi Squared value 21.7059 is larger than critical value 16.919, DF 9, critical criteria 0.05 and P value 0.01 is less than alpha level 0.05. Thus, hypothesis is rejected what means male respondent at equal importance for 10 keywords are rejected. They focused on top 3 keywords Maintain Biodiversity, ICZM and EIA as well as 12 females did.

The Table 8, Chi Squared value 26.28 is larger than critical value 16.919, critical criteria 0.05, DF 9 and P value 0.002 is less than alpha level 0.05. The hypothesis was rejected. Its meaning 95% confidence

interval of age ≥ 40 is significantly different from 10 keywords. They focused on top 3 keywords Maintain Biodiversity, ICZM and EIA.

The Table 9, Chi Squared value 17.71 is larger than critical value 16.919 at critical criteria 0.05, DF 9 and P value 0.039 is less than 0.05. Thus, hypothesis is rejected. Its meaning age ≤ 39 is significantly different from 10 keywords.

Data analysis

In vulnerable marine area updates data, associates GIS illustrative graph and connects practice with concrete scientific evidence. It is not only finding problems but provides effective plans for solution. The multiple objectives are related to achieve economic, environmental sustainability, minimize and reduce conflicts of user-user and user-environment conflicts, that is dealt with integrated management [17]. The article further implemented analysis for top 3 keywords Maintain Biodiversity, ICZM and EIA.

Table 10, the total 90% includes young 43.33% ≤ 39 ages and elder 46.67% ≥ 40 ages. The meaning has no gap generation and almost each respondent selects Maintain Biodiversity is the most important keyword. Biological diversity plays an important role in enhancing resilience by increasing some species or functional groups will be resistant to perturbation, allowing species to compensate one another within community, facilitating ecological processes vital for recovery and adaptation [11].

Table 11, the total is 80% including young 36.67% ≤ 39 ages and elder 43.33% ≥ 40 ages. Connectivity among species, populations, and ecosystems enhance capacity for recovery by providing sources of propagules, nutrients, and biological legacies. The adaptive capacity includes combination of phenotypic plasticity, species range shifts, and microevolution [11].

Table 12, the total is 76.67% including young 33.33% ≤ 39 ages and elder 43.33% ≥ 40 ages. What means the majority respondents select EIA is important keyword.

Legal regulation

MSP aims balancing development of maritime activities and increases cross-border cooperation through clearer legislation, better coordination among administrations, and early identification of impacts [9]. Without intervention and strict enforcement of governmental regulation, there will be no meaningful change in preservation of marine ecosystem [18]. Implementing the scientific approach of social issue establishes authority with legal framework, develops mechanism on ecosystem service, carries out enforcement, prevents illegal activities and maintains biodiversity. Each step should follow legal regulation including opinions from multiple stakeholders; reach a consensus in majority after opened discussion, dialogue and public hearing.

Report and file

Maintaining biodiversity, ICZM and EIA should be public, transparent and available to all stakeholders [19]. It is necessary to make compensatory project for stakeholder whom will suffer loss from implementation of majority at consensus and assesses whether has reached desired outcomes. Many managers are not able to systematically monitor performance of MSP because lack ICZM, EIA, legal enforcement and financial support.

Adaptive management

Adaptive management is essential to maintain biodiversity.

S No	Keyword	Observed	%	Predicted	O-P	(O-P) ²	(O-P) ² /P
1	Maintain Biodiversity	12	18.18%	6.6	5.4	29.16	4.4181818
2	Integrated Coastal Zone Management (ICZM)	10	15.15%	6.6	3.4	11.56	1.7515152
3	Environmental Impact Assessment (EIA)	10	15.15%	6.6	3.4	11.56	1.7515152
4	Marine Spatial Planning (MSP)	9	13.64%	6.6	2.4	5.76	0.8727273
5	Promote Marine Education	8	12.12%	6.6	1.4	1.96	0.2969697
6	Marine Ecotourism	8	12.12%	6.6	1.4	1.96	0.2969697
7	Offshore Windfarm	3	4.55%	6.6	-3.6	12.96	1.9636364
8	Aquaculture Associated with Digital Application	3	4.55%	6.6	-3.6	12.96	1.9636364
9	Information Application	2	3.03%	6.6	-4.6	21.16	3.2060606
10	Marine Museum in Virtual Reality	1	1.52%	6.6	-5.6	31.36	4.7515152
Total		66	100.00%	66			21.27

Remarks: 12 Female Probability CHIDIST(X2, DF)=0.011; The.011 is less than .05; Chi-Squared at 21.27 is larger than Alpha .05; df9, Critical Value at 16.919. Thus, rejected the hypothesis; Alfa.05,df9 at 16.919. Each respondent had 5 keywords selections x 12 respondents=total 60 selections; No 25 of respondent selected all 10 keywords; o 26 of respondent selected 6 keywords; Thus, total 66 selections

Table 6: The Chi Squared test for 12 female respondents at equal importance for 10 keywords was rejected.

S No	Keyword	Observed	%	Predicted	O-P	(O-P) ²	(O-P) ² /P
1	Maintain Biodiversity	15	17.65%	8.5	6.5	42.25	4.970588235
2	Integrated Coastal Zone Management (ICZM)	14	16.47%	8.5	5.5	30.25	3.558823529
3	Environmental Impact Assessment (EIA)	13	15.29%	8.5	4.5	20.25	2.382352941
4	Marine Spatial Planning (MSP)	9	10.59%	8.5	0.5	0.25	0.029411765
5	Promote Marine Education	10	11.76%	8.5	1.5	2.25	0.264705882
6	Marine Ecotourism	7	8.24%	8.5	-1.5	2.25	0.264705882
7	Offshore Windfarm	7	8.24%	8.5	-1.5	2.25	0.264705882
8	Aquaculture Associated with Digital Application	5	5.88%	8.5	-3.5	12.25	1.441176471
9	Information Application	3	3.53%	8.5	-5.5	30.25	3.558823529
10	Marine Museum in Virutal Reality	2	2.35%	8.5	-6.5	42.25	4.970588235
Total		85	100.00%	85			21.70588235

Remarks: Probability CHIDIST(X2,DF)=0.01; The .01 is less than .05 Chi Squared 21.706 is larger Than Alpha .05, df9, Critical Value at 16.919. Thus, rejected the hypothesis; Alfa.05,df9 at 16.919. Each respondent has 5 selctions x 18 respondents = total 90 selctions; No 5. respondent selected 1 keyword only; No 6. respondent selected 3 keywords; No 17. respondent selected 6 keywords; Thus, total 85 selections.

Table 7: The Chi Squared test 18 male respondents at equal importance for 10 keywords are rejected.

S No	Keyword	Observed	%	Predicted	O-P	(O-P) ²	(O-P) ² /P
1	Maintain Biodiversity	14	17.28%	8.1	5.9	34.81	4.297530864
2	Integrated Coastal Zone Management (ICZM)	13	16.05%	8.1	4.9	24.01	2.964197531
3	Environmental Impact Assessment (EIA)	13	16.05%	8.1	4.9	24.01	2.964197531
4	Marine Spatial Planning (MSP)	10	12.35%	8.1	1.9	3.61	0.445679012
5	Promote Marine Education	12	14.81%	8.1	3.9	15.21	1.877777778
6	Marine Ecotourism	7	8.64%	8.1	-1.1	1.21	0.149382716
7	Offshore Windfarm	5	6.17%	8.1	-3.1	9.61	1.186419753
8	Aquaculture Associated with Digital Application	3	3.70%	8.1	-5.1	26.01	3.211111111
9	Information Application	2	2.47%	8.1	-6.1	37.21	4.59382716
10	Marine Museum in Virtual Reality	2	2.47%	8.1	-6.1	37.21	4.59382716
Total		81	100.00%	81			26.28

Remarks: Age ≥ 40 Probability CHIDIST(X2,DF)=0.002; The 0.002 is less than alpha 0.05 and Chi Squared 26.28 is larger than Critical Value at 16.919, df9; critical criteria at 0.05. Thus, rejected the hypothesis. Each respondent has 5 sections x 16 respondents=total 80 sections; No 17 of respondent selected 6 keywords; Thus, total 81 selections.

Table 8: The Chi Squared test 16 respondents of age >=40 at equal importance for 10 keywords are rejected.

Monitoring proxies of ecological resilience such as species, population, and genetic diversity can aid tracking efficacy of management strategies as changes in marine ecosystems [11]. The ability of organism to maintain functioning in the face of environmental stress depends on acclimation capacity. Adaptive management strategies incorporate new knowledge of ecosystem functioning which becomes available and will be critical [11]. Adaptive management have been widely recognized as fundamental components for effective marine management [1]. The adoption of Sustainable Development Goal (SDG) demonstrates global

governments, recognize social, economic and environmental agendas, which are intrinsically linked and inseparable [20]. The assessment of SDG performance through adaptive management feeds back into an iterative mechanism, which integrates collaboration through trans-boundary, sets marine conflict with conciliation, management actions have intended effects and plans need to be periodically reviewed and updated. Adaptive management is a systematic approach for improving effectiveness through learning, monitoring and evaluating outcomes [19]. Under the premise of digital collaboration from trans-boundary

S No	Keyword	Observed	%	Predicted	O-P	(O-P) ²	(O-P) ² /P
1	Maintain Biodiversity	13	18.57%	7	6	36	5.142857143
2	Integrated Coastal Zone Management (ICZM)	11	15.71%	7	4	16	2.285714286
3	Environmental Impact Assessment (EIA)	10	14.29%	7	3	9	1.285714286
4	Marine Spatial Planning (MSP)	8	11.43%	7	1	1	0.142857143
5	Promote Marine Education	6	8.57%	7	-1	1	0.142857143
6	Marine Ecotourism	8	11.43%	7	1	1	0.142857143
7	Offshore Windfarm	5	7.14%	7	-2	4	0.571428571
8	Aquaculture Associated with Digital Application	5	7.14%	7	-2	4	0.571428571
9	Information Application	3	4.29%	7	-4	16	2.285714286
10	Marine Museum in Virtual Reality	1	1.43%	7	-6	36	5.142857143
Total		70	100.00%	70			17.71

Remarks: 14 respondents; Probability CHIDIST(X2,DF)=0.039; the.039 is less than 0.05 Chi-Squared at 17.71 is larger than criteria 0.05; df9, Critical Value at 16.919. Thus, rejected hypothesis.

Table 9: The Chi Squared test 14 respondents of age <=39 at equal importance for 10 keywords are rejected.

Gender (All)		Maintain Biodiversity		
Age	Quantity	Important	No Comment	Total
≤ 39 (Young)	People	13	1	14
	%	43.33%	3.33%	46.67%
≥ 40 (Elder)	People	14	2	16
	%	46.67%	6.67%	53.33%
People Total		27	3	30
% Total		90.00%	10.00%	100.00%

Table 10: Maintain Biodiversity rating 90% selection at age.

Gender (All)		ICZM		
Age	Quantity	Important	No Comment	Total
≤ 39 (Young)	People	11	3	14
	%	36.67%	10.00%	46.67%
≥ 40 (Elder)	People	13	3	16
	%	43.33%	10.00%	53.33%
People Total		24	6	30
% Total		80.00%	20.00%	100.00%

Table 11: ICZM rating 80% at age.

Gender (All)		EIA		
Age	Quantity	Important	No Comment	Total
≤ 39 (Young)	People	10	4	14
	%	33.33%	13.33%	46.67%
≥ 40 (Elder)	People	13	3	16
	%	43.33%	10.00%	53.33%
People Total		23	7	30
% Total		76.67%	23.33%	100.00%

Table 12: EIA Rating 76.67% at age.

activates idle resource on complementary contribution, governmental policy emphasizes quality of ecological conservation, associates with monitor mechanism and improves value chain of biology.

Results and Discussion

Participants from all the age groups; elder age included ≥ 40 and younger ≤ 39. Gender included male and female both. The total 30 respondents multiplied by each one 5 selections made 150 selections. But No. 5 respondent selected 1 keyword only; No. 6 selected 3 keywords; No. 17 selected 6 keywords, No. 24 selected 10 keywords; No. 25 selected 6 keywords which included 18 male respondents 85 selections and 12 females had 66 selections, total 151 selections. Who had top 3 common keywords Maintain Biodiversity, ICZM and EIA. Meanwhile, elder age ≥ 40 and young ≤ 39 had same top 3 keywords, also (Table 2).

Table 3, the statistical inference at critical criteria 0.05, t test statistics 0.568 is less than one tailed critical value 1.739. The P value one tailed 0.288 and two tailed 0.577 are larger than significance level alpha 0.05. What means elder age ≥ 40 and young age ≤ 39 is no significant difference from 10 keywords each other. They apparently have no significant gap generation and focus on top 3 keywords Maintain Biodiversity, ICZM and EIA. The same number of observation 10 has different measure of central tendency Mean 8.1 for elder, 7 for young and measure of dispersion Variance 23.6555 for elder, 13.777 for young. What means elder age ≥ 40 is much high dispersion and variant than young age ≤ 39. Taking reference contents of Table 2 prove the results of Table 3.

Table 4, the statistical inference, critical criteria 0.05 t test statistics 1.00 is less than critical value one tailed 1.7340. The P value 0.1652 one

tailed and 0.3305 two tailed are larger than significance level alpha 0.05 what means male 18 respondents and female 12 respondents are no significant difference from 10 keywords each other. They focus on top 3 keywords. The number of observation 10 have different measure of central tendency Mean 8.5 for male, 6.6 for female and measure of dispersion Variance 20.5 for male, 15.6 for female what mean male is high dispersion and much variant than female. Taking reference contents of Table 2 proves the results of Table 4.

Table 5, the same Data 10 have different Sum 85 for male, 66 for female because male 18 respondents had higher selection than female 12. The same Median 8 for male and female, but different Mode 7 for male, 10 for female, different measure of central tendency, Mean 8.5 for male and 6.6 for female which indicating male scale is larger than female. The measure of dispersion, Standard Deviation (SD) 4.527 for male, 3.949 for female indicates high dispersion of male, as Variance 20.5 for male is higher than female 15.6. The male dispersion is much variant than female. The same Data 10 and Range 12 of age have different Sum 81 for elder 16 respondents and 70 for young 14 respondents. The measure of central tendency Mean 8.1, Median 8.5 of elder is larger than Mean 7, Median 7 of young. The measure of dispersion SD 4.863 and Variance 23.665 for elder ≥ 40 are the largest among young, male and female. It means age ≥ 40 selections from 16 respondents focus on top 3 or low keywords resulting in high dispersion. However, it has same top 3 keywords Maintain Biodiversity, ICZM and EIA.

Table 6, the 12 female respondents multiplied by each one 5 selections made 60 selections. But No. 25 of respondent selected 10 keywords, No. 26 selected 6 words, thus, total 66 selections. The statistical inference, significance level alpha 0.05, degree of freedom (DF) 9, critical criteria 0.05, conducted Chi Squared test and the value 21.27 is larger than critical value 16.919. Meanwhile, P value 0.011 is less than significance level alpha 0.05. What means 95% confidence interval, 12 female respondents are significant difference from 10 keywords and focus on top 3 keywords Maintain Biodiversity, ICZM and EIA.

Table 7, the 18 male respondents multiplied by each one 5 selections made total 90 selections. But No. 5 respondent selected 1 keyword only, No. 6 selected 3 keywords, No. 17 selected 6 keywords, total 85 selections. The statistical inference, DF 9, critical criteria 0.05, conducts Chi Squared test and gets the value 21.7059 is larger than critical value 16.919. The P value 0.01 is less than significance level alpha 0.05. What means 18 male respondents are significantly different

from 10 keywords and focus on top 3 keywords Maintain Biodiversity, ICZM and EIA as well as 12 females do.

Table 8, the 16 respondents of elder age ≥ 40 multiplied by each one 5 selections made 80 selections. But No. 17 respondent selected 6 keywords. Thus, total 81 selections. The statistical inference, critical criteria 0.05, DF 9, conducts statistical Chi Squared test and gets value 26.28 which is larger than critical value 16.919. The P value 0.002 is less than significance level alpha 0.05. What means 95% confidence interval of elder age ≥ 40 is significantly different from 10 keywords. They actually focused on top 3 keywords.

Table 9, the 14 respondents of young age ≤ 39 multiplied by each one 5 selections made total 70 selections. But No. 5 respondent selected 1 keyword only, No. 6 selected 3 keywords, No. 25 selected all 10 keywords, No. 26 selected 6 keywords, total 70 selections. The statistical inference, critical criteria 0.05, DF 9, conducts Chi Squared test and gets value 17.71 which is larger than critical value 16.919. The P value 0.039 is less than significance level alpha 0.05. What means 14 respondents of young age ≤ 39 are significantly different from 10 keywords and actually focus on top 3 keywords.

Discussion

A multitude of uncoordinated activities resulted in irreversible loss and substantial damage biodiversity such as habitat loss, use-environment conflicts. There were not all uses with compatibility, competing for ocean space or had adverse impact one another as use-use conflicts, shipping, offshore wind farms and significantly reducing the loss of biodiversity of coastal ecosystems [16]. Marine Spatial Planning (MSP) is the science for assessing, communicating tradeoffs among uses of ocean and identifying strategies to catch up policy opportunities from efforts to implement ecosystem-based management (EBM) [18]. It can be used as a tool reducing conflict and find compatible uses of ocean and coastal space [19]. The rational planning follows universal principles and steps presenting alternative perspective that are highly differentiated and place-specific Table 13 [20].

Top 3 keywords

Table 10 Maintain Biodiversity, the total cross analysis rating 90% includes young 43.33% ≤ 39 ages, 14 respondents and elder 46.67% ≥ 40 ages, 16 respondents. It indicates no significant gap generation and 90% respondents select Maintain Biodiversity is relatively important keyword. Meanwhile, the analysis of 14 young respondents ≤ 39 has 92.86% preference which is higher than the analysis of elder ≥ 40 at

Plan	Corrective Measures	Advantage	Problems and Demands	Remedial	Preliminary Conclusion
Build Underwater Museum of Thermal Power in place of restarting discard plant	<ol style="list-style-type: none"> 1. Activate discard asset 2. In consistent ecological tourism with surrounding National Museum and PaDouTzu recreational fish port 	<ol style="list-style-type: none"> 1. Amplify effect of ecological conservation with vale chain integration 2. Increase tourist revenue 	<ol style="list-style-type: none"> 1. Inconvenient transportation 2. No integration of relative facilities 	<ol style="list-style-type: none"> 1. Setup shuttle bus between train station and Museum 2. Increase frequency on holiday 3. Implement ICZM 	Available
Construct ecological touristy aquaculture in place coal of dock	<ol style="list-style-type: none"> 1. Connect museum, fish port with ecological tour 2. Link Academia Sinica aquaculture with Marine Resource Resilience Center 	<ol style="list-style-type: none"> 1. Activate discard power plant 2. Integrate fish port resource 3. Dgital technique developing tourism aquaculture 	<ol style="list-style-type: none"> 1. Inconvenient transportation 2. Lacks coordination of various fields 	<ol style="list-style-type: none"> 1. Amplify effect of ecological tour 2. Integrate artificial intelligence, internet of things with aquaculture 3. Nation policy exporting global marine technology 	Available
Upgrade current LPG terminal to LNG Renewable Energy at Shen Ao water	Upgrade current facility	<ol style="list-style-type: none"> 1. Use natural resource 2. Research and develop technology 	Insufficient data	Invite expert, scholar to evaluate feasible possibility	Need study and evaluate

Table 13: Fish Port with Marine Spatial Transitional Plan.

87.50%. It means young generation put much emphasis on Maintain Biodiversity than elder. Biological diversity plays an important role in enhancing resilience by increasing some species or functional groups will be resistant to perturbation, allowing species to compensate one another within community, facilitating ecological processes vital for recovery and adaptation [7].

Table 11 ICZM (Integrated Coastal Zone Management), the total cross analysis rating 80% includes young 36.67% \leq 39 ages, 14 respondents and elder 43.33% \geq 40 ages, 16 respondents. Meanwhile, the analysis of young 14 respondents 78.57% preference is less than the analysis of elder 16 respondents 81.25%. It means elder generation put much emphasis on ICZM than young. Connectivity among species, populations and ecosystems enhance capacity for recovery by providing sources of propagules, nutrients, and biological legacies. The adaptive capacity includes combination of phenotypic plasticity, species range shifts, and microevolution [7].

Table 12 EIA (Environmental Impact Assessment), the total cross analysis is 76.67% including 14 respondents young 33.33% \leq 39 and 16 respondents elder 43.33% \geq 40 ages. What means the majority respondents select EIA is an important keyword. Meanwhile, the analysis of young 14 respondents has 71.43% preference EIA which is less than analysis of elder 16 respondents 81.25%. That means elder generation puts much emphasis on EIA than young.

Marine spatial planning

Marine sciences have recognized interdependence of social, ecological systems and cumulative effects of multiple environmental pressures [21]. Without considering existence of conflicts and human impacts, marine ecosystem has inherent need to function sustainably [14]. The Figure 2a is based on UNESCO analyzing current situation, mapping important area, identifying conflict compatibility and area of human activities. Sustainable and precise spatial allocation is an important task, which balances high competition for limited marine space between sectorial interests [5]. Managing MSP will involve balancing trade-offs between different components. The challenge will be to balance benefits of managing for ecological resilience with the associated social and economic costs [7]. The plan 1 Maintain Biodiversity, establishing underwater museum of thermal power associates with virtual reality technology for maintaining biodiversity. Plan 2 ICZM, considering effect of amplification, managers create incubation of aquaculture, associate Pa Dou Tsu Touristy Fish Port, Shen Ao Fish Port with National Marine Museum Scientific and Technology (NMMST) for holistic quality control of ecotourism in aquatic cultivation. Plan 3 EIA, competent agency utilizes existing resource for renewable energy, upgrades current LPG (Liquefied Petroleum Gas) to LNG (Liquefied Natural Gas) of Shen Ao water. All above plans are good examples for maintaining biodiversity, ICZM and EIA. The ultimate decision on what space will be allocated for what use (or non-use) is a matter of societal selection [14]. Planners should always keep in mind their function is to generate information for decisions makers, not to make decisions.

Illegal overfishing of a regulated species damages marine ecosystem resulting in degradation of coastal estuary and habitat. MSP often focuses achieving the specific sectorial objectives, related to national important strategic priorities [22]. Exercising preventive, precautionary and anticipatory approaches avoids degradation of marine environment and reduces risk of long-term or irreversible adverse effects. [23]. Shen Ao branch of Taiwan Power Company (TPC) proposed to restart discarded thermal plant and construct coal dock for

fuel unloading. The site selection locates Ecological Conservation Area of fish port is confronted with national policy of energy in transition [24]. International relations are making disciplinary diversity necessary in ways integrating perspectives and learn how to communicate results in governance processes [21]. The estimated site of coal dock locates Ecological Conservation Area within 3 miles Protection Zone, where is designed as first grade coastal conservation zone, in accordance with Article 12, Coastal Zone Management Act, Taiwan as Figure 2c. If TPC restarts discarded thermal plant will pollute quality of air, construct dock will damage intertidal ecological habitat, loss biodiversity on ecological conservation, degrade recreational fishing activity, ecotourism on NMMST, influence public participation activity on Pa Dou Tzu Touristy Fish Port and violate regulation of Coastal Zone Management Act, Taiwan.

Maintain biodiversity; build underwater museum of thermal power and associate with virtual reality technology: How effectively uses international law at innovation to conserve and sustainably manage marine biodiversity beyond jurisdiction of state. On 24 February 2017, a workshop entitled “Law Beyond Boundaries: innovative mechanisms for the integrated management of biodiversity beyond national jurisdiction” was held in Australia. Which contributes ongoing discussions at United Nations General Assembly [25]. Levels of higher trophic diversity are threatened by over exploitation.

Net effect of diversity on recovery and overall community composition depends on frequency and magnitude of disturbance [7]. The loss of marine biodiversity is impairing ocean’s ability to produce seafood, resist diseases, maintain water quality and recover from over-fishing and climate change [14]. Systems with low species diversity are likely to lose functional traits. Species diversity enhances resistance by increasing range of responses to environment and likelihood that species can functionally compensate for one another. Diversity increases variety of responses to disturbance and likelihood that species can compensate for one another [7]. The loss of biodiversity alters species composition and subsequent loss of ecosystem functioning documents in marine habitats across the globe [26].

Terrestrial area of Taiwan is occupied 0.03% of the global, but species at quantity is 4% of the world which is 150 times of average value, marine biology is occupied 10% which is 360 times for global average. Taiwan is famous of biodiversity [27]. Among multiple human impact threatens functioning of coastal ecosystems, anthropogenic acts on the most extensive spatial temporal scales and poses some of most severe threat [7]. The estimated site of coal dock locates Ecological Conservation Area of Shen Ao fish port within 3 nautical miles multiple Protection Zone as Figure 2a. The dock construction will damage Ecological Conservation Zone, impair marine resilience in fisheries at 3 nautical miles of Protection Zone under ICZM Act, Taiwan, influence adjacent national museum NMMST as EIA and confront with State Policy of Energy Transition. Some impacts are irreversible once occurred and

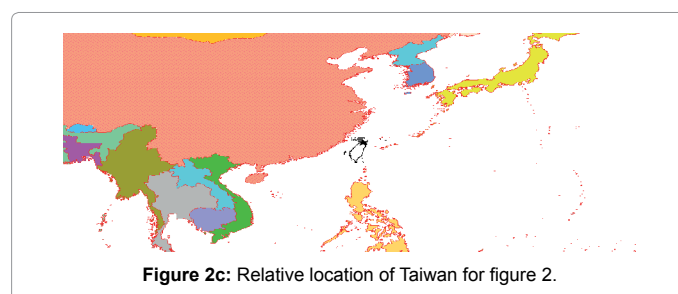


Figure 2c: Relative location of Taiwan for figure 2.

reinstatement of the original conditions are impossible [28]. Areas with high diversity or endemic species can be targeted for marine reserves to maintain functional redundancy and response diversity. Implementing fully protected (or no-take) marine reserves and other types of MPAs is strategy for maintaining or increasing multiple forms of diversity, connectivity, and adaptive capacity to enhance resilience [7]. Its advantage is replacing by renewable energy but defect is irrecoverable. Offshore energy, tourism are facing increasingly flourish and activities will continue, even more likely accelerate [14]. The Article 8 of Convention on Biological Diversity (CBD), special measures need to be taken maintaining biodiversity. Develop necessary guidelines for establishment and management of areas where conserve biodiversity to ensure conservation and sustainable use [29].

The implementation without planning is a recipe for failure and plan without implementation is sterile. Marine spatial management will not be achieved unless all stakeholders including decision-makers, politicians, resource managers, bureaucrats, and general public understand net benefits. The virtual diving in underwater archaeological site of Cala Minnola has been publicly presented on 6th November 2016 at the exhibition "Mirabilia Maris. Treasures from the seas of Sicily" [30]. The digital technology associates virtual reality of marine recreation with Ecological Conservation Area, integrates maintaining biodiversity through EIA in ecosystem service. Virtual scene is populated with 3 dimension models of the flora and fauna in typical specific marine ecosystem, such as fishes, seagrass and seaweed plants [30]. The virtual visits are quite impressive in 3D versions, 360-degree filming and other technical procedures. Examples are Virtual Dive project in France, virtual access to French Lune wreck provided by DRASSM and Dassault 3D, and Pavlopetri project at University of Nottingham [31].

Ecosystem based management (EBM): A framework of Ecosystem-Based Approach with MSP has been discussed and promoted by coastal managers more than decade [32]. As present and future demand for marine resources, activities of exploitation are expected to be increased, which implements high pressure on ecosystem, competition and conflicts among marine users [5]. Protecting ecological mechanisms allows ecosystems to resist, recover from, and adopts to adaptive management will help to ensure that coastal marine ecosystems persist and continue to provide benefits [7]. EBM becomes widely accepted for providing important framework at assessing biodiversity, ecosystem services and implementing potential responses [14]. One core challenge for translating EBM and MSP from concept to practice develops approaches for balancing diverse human uses of ecosystem which services range from tangible to intangible includes food production, aesthetic value and natural capital for human welfare [33]. The EBM establishes communicative platform for interaction with convenient prompt opinions and coordinates various interests of stakeholder in competitive zone, in accordance with Article 16 of Coastal Zone Management Act, Taiwan. The EBM is an overarching framework for maintaining biodiversity [34]. EBM embodies adaptive flexible governance and management systems which require effective information providing mechanisms, rely on appropriate monitoring and integrated assessments [35]. The seminal step-by-step guide of UNESCO's further notes MSP can be used selecting appropriate management strategies to maintain biodiversity [36]. EBM protects structure, function and process of ecosystem, integrates ecological, social, economic, institutional perspectives, which is place-based (adapted from COMPASS, 2005) [16]. Achieving EBM objectives, managers look for interdisciplinary scientific information to meet complex challenges with decision making processes.

Coastal marine ecosystems are among the most valuable and heavily used natural systems worldwide. Which provides many important ecosystem services, including shoreline protection, food from fisheries and aquaculture [7]. The arrangement of release in fishery conserves biological significant species on restoration and increases marine resource from aquaculture cultivation. In conformation with Southward Policy of State, council associations export marine technology to ASEAN countries and global market. Managers select breeding fishery in release, foster superior species on seeding and evaluate nurturing management on harvesting plan. It connects AI, IOTs with aquaculture, catches emission of carbon dioxide for culturing algae to feed indigenous species, increases revenue through ecotourism in cultivation and ensures artificial propagation. Nurturing species at artificial incubation for substantial release is the most effective way of increasing marine resource. Before planners engaged in seeds and seedlings of species on release, should consider what kind of fry, where, when, scale, quantity and the way how to release. The substantial artificial reef nurtures marine resource and prevents intrusion into ecological vulnerable areas, where environment needs to be protected for restoration and enhance propagation of native specific species.

Precautionary measure: Managers have recognized complex interactions between various human uses of ecosystems. A tendency for decisions about tradeoffs to be made implicitly, which is often exacerbated by fragmented or single sector managed independently [33]. Accumulation of quantitative data encourages multiple complementary of trans-boundary, integrates technical concept on innovation, further develops qualitative analysis and improves compatibility of resource through scientific approach. Ecological sustainability is the principle of MSP, comprehensive resilience at habitat, strategic alliance indicates distinctive opinions and implements effective measures to prevent deterioration. MSP definitely needs cooperation from trans-boundary, proposes incentive mechanism and increases efficiency through technological support innovation. If resources are unscrupulous use, the speed of consumption is much faster than producing and it will be exhausted soon. The measure is based on ecosystem management. Planners consider spatial temporal allocation, human activities on marine ecology and need adaptive management to achieve sustainable use.

The endurance capacity of vulnerable environments through EIA ensures effective protection, takes necessary measures to conserve natural resources and prevent damage to flora and fauna of marine environment [37]. Ecological or biological conservation from ecosystem resilience is an important approach for maintaining biodiversity. It stabilizes compatibility through spatial management, which is composed of scientific analysis and takes managed measure to complete overall performance. Variability and uncertainty in ecosystems is imperative to implement precautionary approach in the planning and governance framework [26]. The CBD regulates ecological or biological significant area (EBSA) for sustainable development. Only conservative isolation in protection is not able to deal with complicated scenarios from multiple uses overlapping in conflict. It will be too late to protect after there were damaged. Competent agent implements precautionary measure alleviating environmental degradation, monitors performance for adaptive management gradually and combines interactive network with relevant ecosystem. Under the premise of ecological, economic, social and cultural perspectives, preventing natural disaster is impossible, however, precautionary measure reducing probability of disaster and adverse impact. That are possible for alleviating systematic disasters and ecosystem degradation.

Integrated Coastal Zone Management (ICZM); construct research center of aquaculture cultivation replacing coal dock: The ICZM balances commercial compatible operation, resilience of habitat for maintaining biodiversity and EIA are overarching infrastructure for MSP. It implements precautionary measure, reducing conflict and formulates mechanism of protection, simultaneously explores high economic value and enhances quality control of ecological chain. The Article 10 of Coastal Zone Management Act, in the event two or more businesses are involved, competent authority of the main business shall jointly formulate plan with related agencies. The central competent authority may designate agency or directly formulate the plan. It suggested aquaculture has advantages over wild fisheries that artificial selection operates at much faster scales in aquaculture to maintain production levels [38]. Regulatory challenges and dysfunctional licensing in particular are often key reasons for the failure of aquaculture to meet its potential in many regions of the world [39]. Marine nurturing technology in fry on propagation associates experienced management at aquaculture, Artificial Intelligence (AI), Internet of Things (IOTs) with comprehensive integration, which infrastructure has to be weighed against protection of ecosystems, promotion of aquaculture, tourism development and benefits of economic growth [40]. Ageing ground of fish at productivity relies on nurturing species to satisfy demands of consumptive activities. AI innovates tradition, provides marine seaweed generating electricity and formulates value of chain in environmental protection on habitat resilience. Activating discarded plant combines existing NMMST, recreation ecotourism; global aquaculture links transitive technology and connects aquaculture of Academia Sinica and resilience center of marine resource. This article makes alternative plan of ecological center at aquaculture cultivation to alleviate environmental degradation and improving local communities in economics by autonomous arrangement through ecotourism protection and biodiversity with native characteristic.

Comprehensive communication: Connectivity among habitats and populations in marine ecosystems are critical for population and species persistence. The connectivity can occur through the movement of individuals or materials across permeable habitat boundaries [26]. In consideration of ecological conservation, environmental protection, public participation of stakeholder and comprehensive communication are necessary. Which examines holistic ecosystem service generating biodiversity, conserved priorities and apply in environments globally [41]. That emphasizes managing multiple use of marine space, where conflicts among users and environment in ecological or biological significant areas [17]. Multiple forms of connectivity among species, populations, and ecosystems can stabilize ecosystems under moderately improving recovery more severe disturbances [11]. ICZM is a process for coastal management which integrates all aspects of coastal areas balancing environmental, economic, social, cultural and recreational objectives in an attempt to achieve sustainability [13]. The strength of optical remote sensing in ICZM can display complex issues in a visual format, providing a new window to look at ecosystem [42]. "The problems of ocean space are closely interrelated and need to be considered as a whole" Preamble to the United Nations Convention on the Law of the Sea, 1982 [1]. Integrated ecosystem assessment puts considerable effort in formative years into conducting integrative science and generating publications as establishing scientific credibility [43]. The integrated resource through digital technology propagates productivity of endangered species by cultivation and recreational fishery associates ecotourism with marine environmental protection.

Trade offs: The ICZM provides integrated framework, uses

scientific collection with social fundamental data, draws on natural resource, and innovates AI and implements marine biological protection at habitat. Effectiveness of MSP is focused on achieving optimum trade-offs between a diversity of ecological, economic and social objectives [22]. A complementary approach integrates appropriate jurisdictional boundaries as local, regional, state and international [1]. The platform of comprehensive synergy coordinates problem solving from multiple interests with trade-off, which preserves biological resource, protects local features ecosystem and implements adaptive management over time in sustainability. Many spatial plans protected areas and offshore fisheries are managed. However, political drivers dealing with environment and fisheries management are strong [44]. The innovative digital technology coordinates strategic partners with complementary, drives collaborative alliance and implements appropriate management. AI connects communication for activating the idle resource in ecosystem service through IOTs. The ecological chain of value on ICZM emphasizes EIA including interdependent biodiversity, commercial catch and biological conservation. In compliance with ecosystem regulation, environment and hydrology, managers establish framework to protect biological valuable chain and implement appropriate ecological conservation under review of EIA and ICZM. Stakeholder participation is formulated with policy on particular area and emerges more layout directives. The biodiversity increases synergy, maintains stability in sustainability, elaborates comprehensive plan, manages platform at overall integrity and reaches consensus through scientific expounding.

Environmental Impact Assessment (EIA); upgrade current lpg terminal to lng renewable energy: Renewable energy is also called alternative energy, usable energy derived from renewable sources such as solar, wind power, hydroelectric rivers, tidal and biofuels [45]. The Renewable Energy Development Act, Taiwan is formulated for encouraging energy diversification, improving environmental quality, assisting relevant industries and enhancing sustainable development [46]. If LNG (Liquefied Natural Gas) is neglected leaking gas or hit by natural disasters such as earthquake, tsunami, flood results in explosion which local community is dangerous completely destroyed. Therefore, Shen Ao conservative community prefers restarting discard thermal plant with coal dock in place of renewable energy LNG. Planners further identify optimal LNG designs that minimize spatial conflicts, maximize value of each sector and connect ecosystem value under EIA. The LNG is a clean and safe renewable energy for National Policy of Energy at Transition, which is an overarching approach from current LPG (Liquefied Petroleum Gas) terminal to LNG. The exploitation of LNG should consider channel of marine transportation, traditional operation in fishery and mineral excavation through EIA. It simulates computer model for analyzing adverse impact, positive reaction of chain and associates with transitional energy policy through technological integration, EIA and ICZM.

Problem solving connects with environmental protection for achieving sustainable developments, which monitors performance with effective management, reduces conflict and mitigates impact of ecosystem from human activity. Increasing human pressures on coastal and offshore waters resulted in complex conflicts among different human activities, which are often competing for space and interactions between human activities and marine environment protection [35]. The fastest growing use of renewable energy is catalyzing debate around how decision makers allocate ocean space [2]. Renewable energy is found within coastal environment where characteristics, particular challenges in sustainable management has, varies in nature and extents around country as ports and submarine [47]. The ecosystem approach

has become widely accepted framework for delivering sustainable development in marine environment. It provides framework for assessing biodiversity and ecosystem services [17]. Experts assess feasibility of renewable energy with touristy aquaculture and cooperate with complementary stakeholder in compatibility. The compatibility development looks alternative plan for problem solving and gains substantial profits through collaborative integration on trans-boundary. The political expedient in ideology of decision-maker predominately controls resource allocation, leaves political disagreement aside, moves forward strategic alliance with economic progress and ecosystem protection.

The EIA means managed plan based on scientific, objective and comprehensive surveys, evaluations conducted prior to determine degree and scope of potential impact of activity or policy on environment includes economy, culture, ecology and social environment [48]. The environmental changes impact overall levels of biological organization and disrupt ecosystem function [11]. EIA covers cultural landscape, seascape measure, explores vulnerable areas of coast and recommends rectification to improve ICZM [49]. Thermal generation with fuel coal increases particular material (PM) in the air which is not acceptable for EIA. A holistic legal basis, enforceable duty, enforcement tools or evaluation of ecological effects are positive approach for EIA [1]. Impact assessment provides public policy-makers with best available information, minimizes costs, maximizes benefits in association with development [28]. The Article 3, economic, technological and social development shall equally emphasize environmental protection based on national interests. [10]. Planners focus problem solving on collaborative communication, implements strategic alliance for sharing experience, performance and achievement. Under the regulation of EIA for comprehensive assessment, the conflicted area includes Ecological Conservation Zone, sites of discarded plant and estimated coal dock which should be evaluated and investigated ICZM where the place is exclusive or compatible use. This article proposes plan 1 activating discarded plant for establishment of underwater museum to improve recreational ecotourism of community-based for enhancing standards of livelihood. This replaces air pollution; harmful activities damage ecosystem, habitat and biodiversity. In consistent ecotourism with neighbor national museum, Pa Dou Tzu Touristy Fish Port amplifies related effect of conservation and integrates value of ecological chain. Ecosystem services emerges requirement of ICZM where framework integrates GIS and techniques mapping recreation opportunities, provided by coastal and marine ecosystems [50].

Conclusion

The article obtained top 3 relatively important keywords Maintain Biodiversity, ICZM and EIA which are all the same for male, female, elder age ≥ 40 , young ≤ 39 and have no gap generation. Meanwhile, they are significantly different from 10 keywords after conducted statistical Chi Squared test within confidence interval 95%. There is no gap generation between ≥ 40 and ≤ 39 after conducted statistical t test at Table 3. There is no significant difference from 10 keywords between male and female after performed statistical t test as Table 4. Performing them at case study for 3 plans proposals in practice, the plan 1 Maintaining biodiversity establishes underwater museum of thermal power in place of plant restart and activates idle asset for use. The plan 2 performs ICZM, creates aquaculture incubation at site of estimated coal dock for ecotourism. The plan 3 implements comprehensive EIA, upgrades existing LPG to LNG renewable energy. Human cannot prevent natural disaster happening as earthquake but can alleviate adverse impact and adopt adaptive strategy. All above plans are good examples for maintaining biodiversity, EIA and ICZM through MSP.

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