JOSIP KASUM, Ph.D.
E-mail: jkasum@pfst.hr
ZVONKO GRŽETIĆ, Ph.D.
Hydrographic Institute of the Republic of Croatia
Zrinsko-Frankopanska 161, HR-21000 Split,
Republic of Croatia
ELI MARUŠIĆ, M.Sc.
E-mail: emarusic@pfst.hr
University of Split, Faculty of Maritime Studies
Zrinsko-Frankopanska 38, HR-21000 Split,
Republic of Croatia

Traffic Planning
Preliminary Communication
Accepted: June 16, 2007
Approved: July 12, 2007

CONTRIBUTION TO THE DEVELOPMENT OF GENERAL MODEL OF MANAGEMENT AND STRATEGIC DECISION-MAKING IN NAUTICAL TOURISM PORTS

ABSTRACT

It is assumed that in strategic decision-making in managing nautical tourism ports (NTP) various decisions are made on the basis of descriptions, calculations, statistic, economic and other indicators, and also of inadequate number of precise indicators (Branch, A. E., 1998). Therefore, strategic decision-making is slightly uncertain, which, it is assumed, may be modified. This article explores the new measuring elements. They are developed on the sample of 47 NTPs in the archipelagic sea of the Republic of Croatia. It is assumed that by applying the new measuring elements it will consequently result in lowering the unreliability of strategic managing, which will eventually increase the profit of NTP.

KEYWORDS

general model, nautical tourism port, decision

1. INTRODUCTION

The technical assumption is that it is impossible to manage with maximum reliability the technical and technological systems whose parameters cannot be measured. It is therefore expectedly assumed that by increasing the number of measurable parameters the reliability of managing technical and technological systems will be increased (Kasum, J., 2003). It is beyond doubt that NTPs may be categorised as technical and technological systems.

Consequently, from economic point, it may be assumed that uncertainty of strategic managing NTPs will be reduced if the number of precise parameters is increased. This paper presents the proposals on how to calculate the values important for managing NTP and new measuring elements (Stapford, M., 2004).

2. NEW MEASURING ELEMENTS

In this paper two categories of new measuring elements are proposed: the use of coefficients and the density measure.

In the strategic decision-making in managing NTP new coefficients have to be used:

- Quality of helpfulness (K_u),
- Land accommodation capacities (K_{skk}),
- Traffic connections(K_{pp}),
- Location (K_p),
- Availability (K_r),
- Communication accessibility (K_{kd}),
- Spaciousness of sea surface (K_{pmp}),
- Spaciousness of piers infrastructure (K_{pig}),
- Provision of services (K_s), and
- Safety of navigation in relation to weather conditions (K_{sp}),

For instance, NTPs may differ in usable surfaces for different purposes. Some NTPs do not have a parking place, some others' is not sufficient, and the like. They may also differ in the number of workshops for various servicing activities, etc. Some NTPs have dry berth areas which others do not.

Therefore, for comparative reasons it is proposed to use the quality of helpfulness coefficient to keep the ratio between total surface of objects (P_{ob}) designed for various services (receiving and departure of visitors, catering objects, servicing facilities and other

workshops, dry dock areas, sanitary and toilet areas etc.) and the total surface of the marina (P_m).

$$K_u = \frac{P_{ob}}{P_m} \cdot 100 \quad (1.1)$$

Visitors accommodated in NTP are those whose arrival is conditioned by the presence of usable hotel facilities, i. e. land accommodation capacities. Hence, the coefficient of land accommodation capacities should be calculated. It should be equal to the ratio of the number of available hotels (H_r) and a minimum demand for one hotel (1_h).

$$K_{skk} = \frac{H_r}{1_h} \cdot 100 \quad (1.2)$$

NTPs are located in different traffic positions. A location may be valuable from nautical and from the traffic point. Nautical evaluation refers to a subjective, not easily measurable sensation of the beauty of the landscape, of cultural features, etc., which among other parameters affect the decisions of the users of NTP. Traffic point should include evaluation of traffic connections with various traffic infrastructures. Hence it is proposed to evaluate the distance of NTP from traffic departure/arrival point using the coefficient of traffic connection (K_{pp}). It should be equal to the ratio of total amount of evaluated available traffic infrastructures:

- Air traffic (AC),
- Road traffic (ZC),
- Railway traffic (ZP) and
- Maximum rates of evaluation for which the rate nine (9) is proposed.

$$K_{pp} = \frac{AC + ZC + ZP}{9} \cdot 100 \quad (1.3)$$

The distance to the closest traffic junction (L) is proposed to rate (Op) from one to three:

- for distances < 30 km; (Op) = three (3),
- for distances >30 km and< 60 km; (Op) = two (2) and
- for distances > 60 km; (Op) = one (1).

It is proposed to evaluate NTPs according to the evaluation algorithm (Fig. 1).

NTPs are situated at different geographic positions like islands, bays, basins, man-made or natural infrastructures (pontoons and the like), on the coastline etc., which is an important parameter in evaluating their competitiveness. Some NTPs are in towns, small towns, settlements, villages, etc., and some are out of any settlements, to which the term of reference – organised settlements – is used. The vicinity of organised settlements is an important parameter in evaluating the quality of the offer for the amenities out of the marina. The vicinity of organised settlements of different sizes also influences the consumption of boaters outside NTP capacities. This is important for

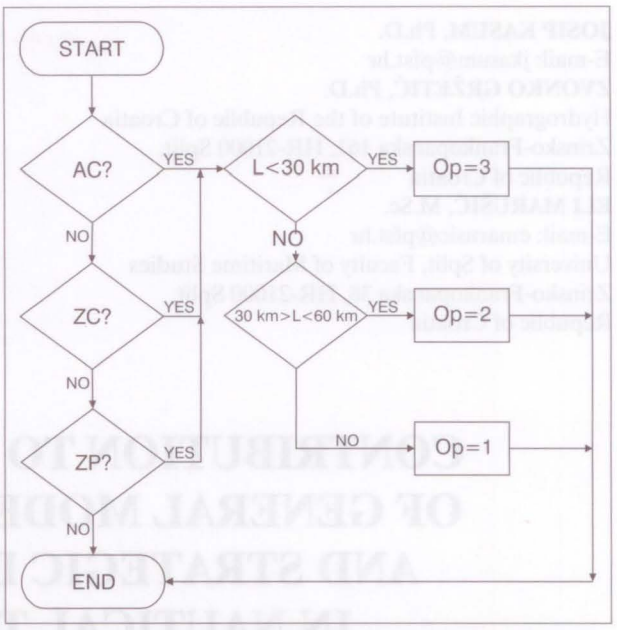

Figure 1 - Evaluation algorithm of traffic infrastructure

the economy of the country of nautical tourism. It is proposed to calculate the coefficient of the position (K_p). It has to be equal to the ratio between the vicinity rating and the size of available organised settlements (R_o) and the proposed maximum total rating five (5).

$$K_p = \frac{R_0}{5} \cdot 100 \quad (1.4)$$

The evaluation (Ob) for NTP should be performed:

- in a town; (Ob) = five (5),
- in a small town; (Ob) = four (4),
- in a village; (Ob) = three (3),
- at the distance from the organised settlement < 50 km; (Ob) = two (2), and
- at the distance from the organised settlement > 50 km; (Ob) = one (1).

Evaluating vicinity of organised settlements has to be calculated using the proposed algorithm (Fig. 2.).

NTPs also differ according to months in which they operate at full technical and technological capacity. Thus, some NTPs are open throughout the year, some are not. Hence, it is proposed to use the coefficient of availability (K_r). Availability of a system refers to the percentage of time in which the system is in working order. Because of that, the availability coefficient has to be equal to the ratio between the number of months operating at full capacity (P_k) and the 12 months of the year.

$$K_r = \frac{P_k}{12} \cdot 100 \quad (1.5)$$

NTPs also differ according to technical devices used for telecommunication contacts. It is assumed to be an important parameter in the speed of acquiring

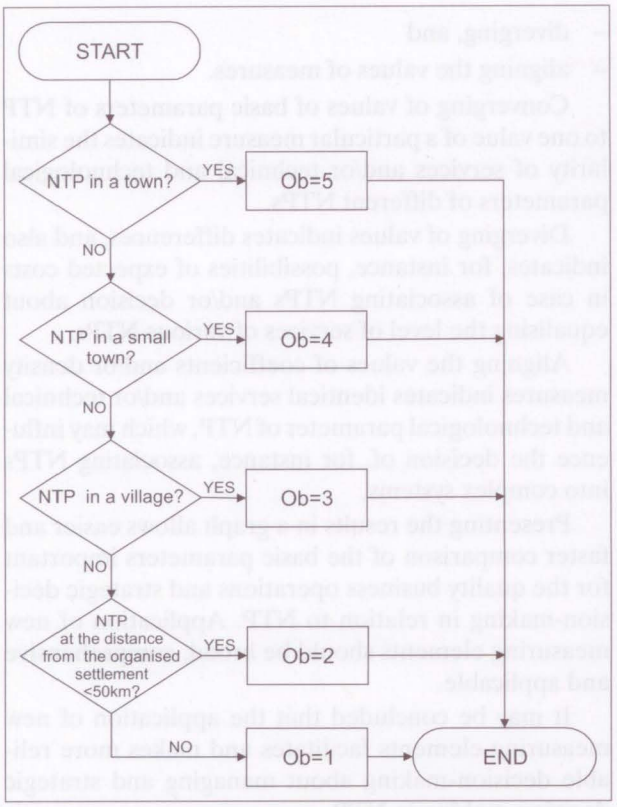

Figure 2 - Algorithm of evaluating geographic position

information and data about NTP significant for the management and/or users (boaters and others). In NTPs the following telecommunication means are used:

- radio stations,
- fixed telephones,
- mobile telephones,
- fax machines,
- satellite telecommunication devices,
- Internet Web, and
- Internet e-mail.

It is proposed to use the coefficient of communication range (K_{kd}). It has to be equal to the ratio between the amount of telecommunication means (n) and the possible number of telecommunication means e. g. seven (7).

$$K_{kd} = \frac{n}{7} \cdot 100 \tag{1.6}$$

There are NTPs which descriptively have the same capacities relating to, for instance, available berths, but in reality they are different in size. For a user, it is not the same, especially due to safety and practical reason of steering a yacht, using a berth in a smaller or a bigger NTP. Therefore, the sea area of NTPs should be known. It is proposed to use the coefficient of spaciousness of sea area (K_{pmp}). It has to be equal to the ratio between total surface of piers (P_g) and total sea surface of NTP (P_{lnt}).

$$K_{pmp} = \frac{P_g}{P_{\ln t}} \tag{1.7}$$

NTPs state descriptively the same capacity of piers, but in reality they differ in usable operating areas. It is assumed that greater areas of piers facilitate operation process of yachts than smaller areas (approach by cars, bicycles, scooters, logistics, embarking, disembarking, etc.). Thus it is proposed to use the coefficient of spaciousness of piers infrastructure (K_{pig}). It has to be equal to the ratio between the total number of sea berths (N_{vm}) and the total area of piers (P_g).

$$K_{pig} = \frac{N_{vm}}{P_g} \cdot 100 \tag{1.8}$$

At NTPs of the same capacities in the operating procedures of receiving, dispatching and providing services to yachts, the management employs different number of people. It is assumed that the greater number of people will provide faster and higher quality service. So, it is proposed to use the coefficient of providing services (K_s). It has to be equal to the ratio between the number of employed people and the number of sea berths (N_{vm}).

$$K_s = \frac{N_z}{N_{vm}} \cdot 100 \tag{1.9}$$

According to the location, NTPs differ in the level of sheltering from weather and other changes (Kasum, J., et al., 2004). The influence of weather and subsequent waves may cause damage. It is assumed that NTPs are mostly exposed to winds from N-(North), S-(South), E-(East) and W-(West), and also from mid-directions. This certainly affects the safety of yachts in NTPs. Therefore, it is proposed to use the coefficient of safety of vessels (K_{sp}). It has to be equal to the ratio between the number of predominant winds (maximum four – n is proposed) from which the NTP is protected and the number of possible predominant winds – four (4).

$$K_{sp} = \frac{n}{4} \cdot 100 \tag{1.10}$$

Density measures are proposed of:

- berths (G_v),
- sources of electricity (EMP) - (G_{emp}), and
- water connections (G_s).

NTPs differ also in the number of berths distributed at infrastructure of piers of different lengths. Certainly, it is assumed that berths at larger piers are also larger. Therefore, it is suggested to calculate the measure for the density of berths (G_v). It may be defined as the ratio between the sum of all berths (N_{vm}) and total length of piers infrastructure (l).

$$G_v = \frac{\sum_{i=1}^{n} N_{vm}}{l} \tag{2.1}$$

NTPs differ in the number of connections to the source of electricity (EMP) distributed at berths. The maximum number of connections facilitates the sojourn of the yachts (using electricity on the coast, charging batteries, etc.). Hence, it is recommended to calculate the measure of density of connections EMP (G_{emp}). It may be defined as a ratio between the sum of all connections EMP (N_{emp}) and the total number of sea berths (N_{vm}).

$$G_{emp} = \frac{\sum_{i=1}^{n} N_{emp}}{N_{vm}} \tag{2.2}$$

NTPs also differ in the number of potable water connections distributed at berths. Maximum number of berths makes life on the yacht easier. It is then recommended to calculate the measure of density of water connections (G_s). It may be defined as the ratio between the sum of all water connections (N_{vod}) and the total number of sea berths (N_{vm}).

$$G_s = \frac{\sum_{i=1}^{n} N_{vod}}{N_{vm}} \tag{2.3}$$

3. DISCUSSION

The effects of application of new measuring elements may be seen in the comparison of characteristics of three hypothetic NTPs (Table 1) and statistic presentation of the calculation results of proposed new measuring elements in the Graph (Table 1.).

The value (Su) refers to the total surface of NTP. It indicates the size of NTP and is a starting point for further analysis. There are three starting points for the interpretation of the results:

- converging,
- diverging, and
- aligning the values of measures.

Converging of values of basic parameters of NTP to one value of a particular measure indicates the similarity of services and/or technical and technological parameters of different NTPs.

Diverging of values indicates differences, and also indicates, for instance, possibilities of expected costs in case of associating NTPs and/or decision about equalising the level of services of various NTPs.

Aligning the values of coefficients and/or density measures indicates identical services and/or technical and technological parameter of NTP, which may influence the decision of, for instance, associating NTPs into complex systems.

Presenting the results in a graph allows easier and faster comparison of the basic parameters important for the quality business operations and strategic decision-making in relation to NTP. Application of new measuring elements should be broad, comprehensive and applicable.

It may be concluded that the application of new measuring elements facilitates and makes more reliable decision-making about managing and strategic decision-making in NTP.

4. CONCLUSION

It may be concluded that the proposed new measuring elements of coefficients and density allow a more precise analysis and faster evaluation of the basic parameters of NTP. So far they have not been stated as exact values. They were mostly described. The use of new measuring elements is proposed to:

- government bodies,
- designers,

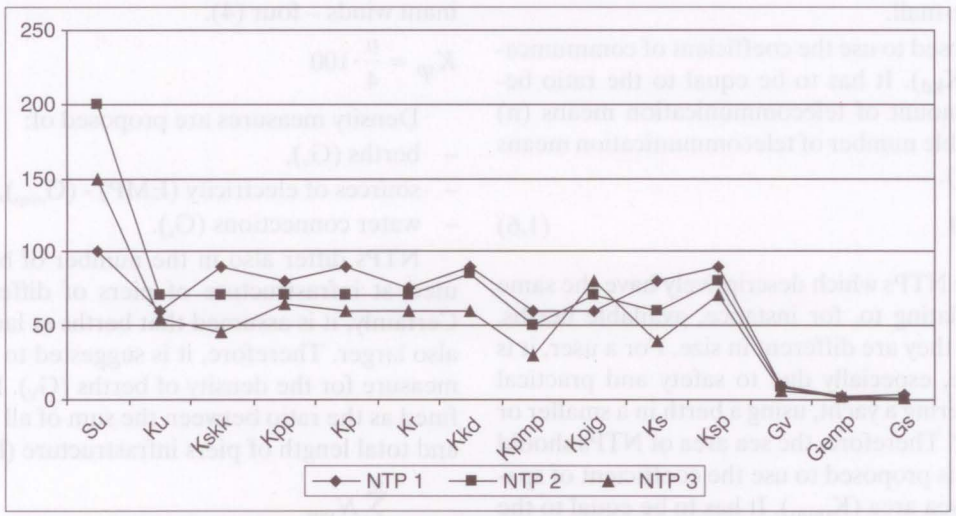

Table 1 - Comparative analysis of different NTPs by applying the proposed coefficients and density measures

- management, and
- users.

Government activities of countries with maritime economy (Stopford, M., 2004) determine the strategies of development of nautical tourism. The basic components of nautical tourism are various activities related to NTPs. New measuring elements facilitate defining the strategy making it more definite (Resolutions of the IHO, 1994).

For the designers, new measuring elements also facilitate designing new NTPs and additional constructions in the existing NTPs. They facilitate more comprehensive calculation of basic costs, and decreasing additional costs.

New measuring elements are extremely important for the management of NTP in deciding their strategy for establishing a network or networks of NTPs, that is, their associating and disassociating. It is assumed that they will facilitate and make faster the insight into competitive advantages of various NTPs.

Finally, the measuring elements are also important for the users (consumers) because they allow thorough insight into the quality of the product (NTP). They will have an easier choice of NTPs accompanied by the increased probability of quality decisions.

The proposed new measuring elements will allow for new researches. They facilitate more comprehensive system-dynamics modelling, and are a contribution to the development of general model of managing NTP system by system-dynamics approach. It is recommended to standardise the measuring elements at the level of agreement with the countries which have a significant tourist activity in using NTPs.

Dr. sc. **JOSIP KASUM**
E-mail: jkasum@pfst.hr
Dr. sc. **ZVONKO GRŽETIĆ**
Hrvatski hidrografski institut
Zrinsko-Frankopanska 161, 21000 Split,
Republika Hrvatska
Mr. sc. **ELI MARUŠIĆ**
E-mail: emarusic@pfst.hr
Sveučilište u Splitu, Pomorski fakultet
Zrinsko-Frankopanska 38, 21000 Split, Republika Hrvatska

SAŽETAK

DOPRINOS RAZVOJU OPĆEG MODELA UPRAVLJANJA I STRATEŠKOG ODLUČIVANJA U LUKAMA NAUTIČKOG TURIZMA

Drži se da se u strateškom odlučivanju o upravljanju lučicama nautičkog turizma (LNT) razne odluke donose temeljem opisa, izračuna, statističkih, ekonomskih i inih pokazatelja, pa i nedostatnog broja egzaktnih pokazatelja (Branch, A. E., 1998). Stoga strateška odlučivanja sadrže izvjesnu mjeru neizvjesnosti, na čije se smanjenje pretpostavlja se, može utjecati. Ovaj rad objašnjava nove mjere. One su razvijene na uzorku od 47 luka nautičkog turizma u arhipelaškom moru Republike Hrvatske. Pretpostavlja se da primjena novih mjera utječe na posljedično smanjenje mjere nepouzdanosti u strateškom upravljanju, što u konačnici između ostalog povećava dobit LNT.

KLJUČNE RIJEČI

opći model, luka nautičkog turizma, odluka

LITERATURE

[1] **Branch A., E.**, (1998) *Maritime Economics, Management and Marketing*, Stanley Thornes, Cheltenham.

[2] **Kasum J.**, (2003) *Updating Sea Charts and Navigational Publications, London*, The Journal of Navigation, Vol. 56; The Royal Institute for Navigation.

[3] **Kasum J.** et al., (2004) *Application of Internet for Automatic Reambulation*, Dubrovnik, IEEE MELECON.

[4] *Resolutions of the International Hydrographic Organization*, 1994. IHO, Monaco.

[5] **Stopford M.**, (2004) *Maritime Economics*. Routledge, pp. 29-35.