

REGIONAL ECONOMIC DEVELOPMENT: SELECTION OF PUBLIC PROJECTS

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ABSTRACT

Local (regional) public projects evaluation and selection is quite important but not well developed topic in economic development (ED). The concept of ED itself is still transforming and amended. Public projects which target intangible outcomes, such as social and cultural development initiatives, are tough to evaluate and find out their priority among each other. This paper offers one universal method to evaluate and prioritize public projects with both tangible and intangible results. Suggested model is based on widely spread among different disciplines double- or weighted-scoring methodology. It works through formulating local (regional) ED priorities, then assigning them relative importance scores and eventually evaluating projects towards compliance to the ED priorities. This method was test-run both at national (Kuwait) level, and at a regional level (South-West Nova, Canada). It proved to be a simple, but reliable tool of prioritizing of public projects.

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KEYWORDS

Cost benefit analysis, IRR, net present value, prioritization of projects, Regional Project Evaluation.

INTRODUCTION

Project evaluation in a private sector is based purely on profitability and returns on cost factors Alapdoosh (2013), but it is not the same in the case of public projects Boardman et.al. (2013), the issue of selecting and implementing public projects is predominated by several factors, including a variety of aspects of the political, social and economic nature. Typically these include issues such as efficiency in the use of existing resources, improvement of accessibility, environmental quality and safety etc.

At the same time genuine economic development (ED) criteria in many cases contradict to goals of the profit-maximizing ventures, for example: extra employment and income generation constitute ED benefit, but an extra cost to businesses.

International, national, regional and local ED agencies work on developing effective methodologies to give objective orientation to investments and funding. In this paper an attempt is made to summarize existing experience and come up with a more or less universal methodology of evaluation and prioritization of public projects.

A double-scoring (weight-scoring) method is designed which incorporates any level of communal (local to national) priorities and the selection of public projects so that objectivity is maintained purely on the rationality of priority ranking. This method would be more meaningful to serve the community on need basis and increase their satisfaction.

LITERATURE REVIEW

Project evaluation has been an important area in the businesses. However its importance has increased from the time foreign aid has flown into government projects because for approvals from the international financial agencies it is important to select the most important project that is viable and benefits the society. These projects in a way have become cost vs benefit evaluation at the time of selecting the project itself. Secondly the funding agencies have begun evaluation on objective basis. Prioritization is a way of dealing with the economics of projects: first how do we allocate limited resources to maximize benefit? Schedlbauer (2011). Second, scope of the project is determined, third, determine which ones are more important than others. As far back as 1973, Mak (1973) understood the relevance of prioritization in deciding project programming. He suggested that "improvements be considered as investments competing for limited resources" Mak (1973), though this was with respect to transportation sector, importance of priorities are based on need to make the maximum use of those resources even in social projects. Hill added to the argument by asserting that in the private sector, the market mechanism drives the allocation of resources. The public sector cannot rely on the market, and must therefore actively pursue a prioritization scheme Hill (1968). Mak (1973) claims that priorities are mostly established subjectively, on the basis of experience of project managers. This method leaves the selection process vulnerable to personal engineering biases and lack of holistic comprehension Mak (1973). Furthermore it lacks consistency and transparency. When applied to a large number of complex projects, it can become unmanageable Mak (1973). Similar argument is echoed in a National Cooperative Highway Research Program (NCHRP) paper from (1978) that: "Priorities established subjectively run the risk of personal engineering bias, lack of comprehensiveness, and political bias", Trigueros (2008). Furthermore, the increasing number, magnitude and complexity of the programs will soon make the subjective analysis unmanageable. A rational approach will take the "politics" out of the process of project selection, and will allow citizens and independent authorities to review and critique the system Trigueros (2008). Turochy and Willis (2006) agree, saying it clarifies "the process such that the technical information is not muddled by the political framework within which the six programming decisions are ultimately made".

The main concern of any prioritization system will be to evaluate identified projects and rank them in order of importance. The level of complexity of the project prioritization processes, though, varies greatly. The literature has described minimum conditions for consideration as an acceptable methodology.

Secondly, there is the discussion of defensibility. Turochy and Willis (2006) define a defensible procedure as one that is "open to scrutiny with respect to the data used in the process and which resultant scores or rankings assigned to projects evaluated are related to the attributes of the proposed improvements." The main concept of defensibility is in the transparency of the data, criteria, and performance measures that allow outside entities to both evaluate the process and ensure that guidelines are being followed. These two characteristics are essential to promote objectivity in project selection. Each prioritization system will be unique, although each will likely involve the following steps: selecting criteria with which to evaluate projects, creating performance measures to compute project compliance to those criteria, combining scores for each performance measure in some way, and finally ranking the projects in order of importance. The criteria selected will directly relate to the locale's concerns, but tend to correlate to the planning factors outlined in ISTEA (the Intermodal Surface

Transportation Efficiency Act of 1991) and TEA-21 (the Transportation Equity Act for the 21st Century of 1998): safety, traffic congestion, environmental impacts, among others. (Turochy and Willis 2006).

METHODOLOGY

According to mathematical theory, projects should be prioritized based on benefits and costs. Thus, a prioritization framework specifies, among other things, the types of benefits its measurement, how project benefits and costs are compared to determine priorities, and how projects are selected to maximize the value of the project portfolio. Formal methods, including value modeling and multi-attribute utility analysis, are available for creating prioritization frameworks that are well-defined, comprehensive, and avoid errors and biases. Aladpoosh, Nejati (2013).

A simple Categorical scale can be used to triage requirements that are within the scope of project selection criteria followed by numeric scale which can be applied to further prioritize the requirements that lie within scope of possible projects. Once the requirements are prioritized, the list is ordered and implementation starts with the most important ones Schedlbauer (2011).

The important methods of defining priorities are categorical, linear numeric and non-linear numeric scales. For a numeric scale, a small value means a low priority (reduced necessity and less urgency), while a large value indicates a high priority (necessary and urgent). For categorical scales, a definition of each categorical value needs to be established so that all stakeholders prioritize from the same perspective. The fig 1. Below summarizes the priority value semantics. Schedlbauer (2011)

FIG. 1 : PRIORITY VALUE SEMANTICS

Priority	Semantics
High/Critical	A critical requirement without which the product is not acceptable to the stakeholders.
Medium/Important	A necessary but deferrable requirement which makes the product less usable but still functional.
Low/Desirable	A nice feature to have if there are resources but the product functions well without it.

Source: Requirements Prioritization Semantics

PRIORITIZATION OF PROJECTS

Private project evaluation is a well-developed discipline Mogenson et.al. (2002). It is founded on comparisons of the cost of the project financing with its revenues or profitability. For that purposes private *project evaluation* or *capital budgeting* engages several methods and techniques, such as payback period, Net Present Value (NPV), Internal Rate of Return (IRR), etc. Parrino et.al. (2011).

Project-evaluation toolkit is hardly applicable though in case of public projects. The difference between private and public projects is in their results. Private profit-maximizing ventures bring measurable tangible monetary results (revenues, profits). In contrast, public projects in most of cases are socially oriented towards intangible results, such as health, education, and environment.

Public-sector counterpart of the capital budgeting methods and techniques used in private sector is the cost-benefit analysis (CBA) Boardman et.al. (2011). The essence of both private capital budgeting and CBA could be illustrated with the following simple Efforts-Results Grid (ERG) (also known as "Affinity Chart" or the "Hi/Lo model").

Under condition of limited resources and multiple opportunities to use these resources (projects) there are always choices to be made on their optimal allocation. If we place alternative projects on ERG, clearly priority will be assigned to ventures located in Low Effort – High Results quadrant providing highest economic efficiency. If there are still resources left a decision should be made whether next priority should be given to Low Effort – Medium Results' or rather to Medium Effort – High Results opportunities. Projects located in the dimmed area most likely will be excluded. Chart 1

CHART 1: EFFORTS – RESULTS – GRID

Efforts	H	High Effort, Low Results	High Effort, Medium Results	High Effort, High Results
	M	Medium Effort, Low Results	Medium Effort, Medium Results	Medium Effort, High Results
	L	Low Effort, Low Results	Low Effort, Medium Results	Low Effort, High Results
		L	M	H
		Results		

The problem of prioritization is in measurement of efforts versus results. Private capital budgeting enjoys total compatibility of efforts/results measurements – both are measured in time/money.

Public projects do have measurable monetary cost, but lack monetary results. The choice is quite simple in cases when alternative projects are aimed to the same results, i.e. health care. In this cases the tool of cost efficiency is used, i.e. the project providing same level of health with the least cost (or more health with the same cost) is clearly preferable.

This is impossible though, when several public projects with different targets are considered. Suppose, the choice is between a monument and a clean-up of a harbor, both cases have monetary cost, but how do we compare the results: a tourist-attracting amenity versus cleaner environment? In such cases CBA is applied to ensure that the public sector allocates scarce resources efficiently to competing public sector projects Layard, Glaister (1994).

The theoretical justification for CBA rests on the *compensation principle* which is used to assign monetary value to a public (social) good or service. Then the priorities are defined by comparing monetized benefits from a public projects with their costs. Public project is justified if gainers can fully compensate losers for their losses and still have some gain left Salvatore (1989), and the higher the gain, the higher the priority of the project.

Monetizing non-market un-priced public goods and services or contingent valuation (sometimes known as the *priority-evaluator technique* or the *stated preference model*) in its turn is based on several methods such as a survey-based willingness-to-pay (WtP) Carson (2004). All these methods and techniques are quite complicated (time-consuming) and often controversial (disputable), Quevedo et.al. (2009).

In the meantime managerial economics offers a variety of decision-making tools and methods helpful in allocating any number and assortment of public projects along the ERG. One common for many disciplines method is based on scoring of the alternatives. Scoring decision-making tools vary from simple CARVER matrix in military special operations Bennett (2007) to double-scoring (weighted-scoring) Pugh method in product design and development Pugh (1991). Among its closer applications is a directional policy matrix method in business project and portfolio analysis Friend (2009).

LOCAL/REGIONAL ECONOMIC DEVELOPMENT APPROACHES AND PROJECTS

ED strategy approaches have been gradually changing ever since Second World War. Literature distinguishes three principal phases of its transformation: the traditional approach, capacity building and a third phase focused on quality of life and flows on information Tassonyi (2005).

More generally, strategic changes in the ED are described as a shift from need-based to assets-based approaches Mahyar (2008). Need-based projects are typically business support in various forms: direct subsidies, investments, tax cuts, etc.

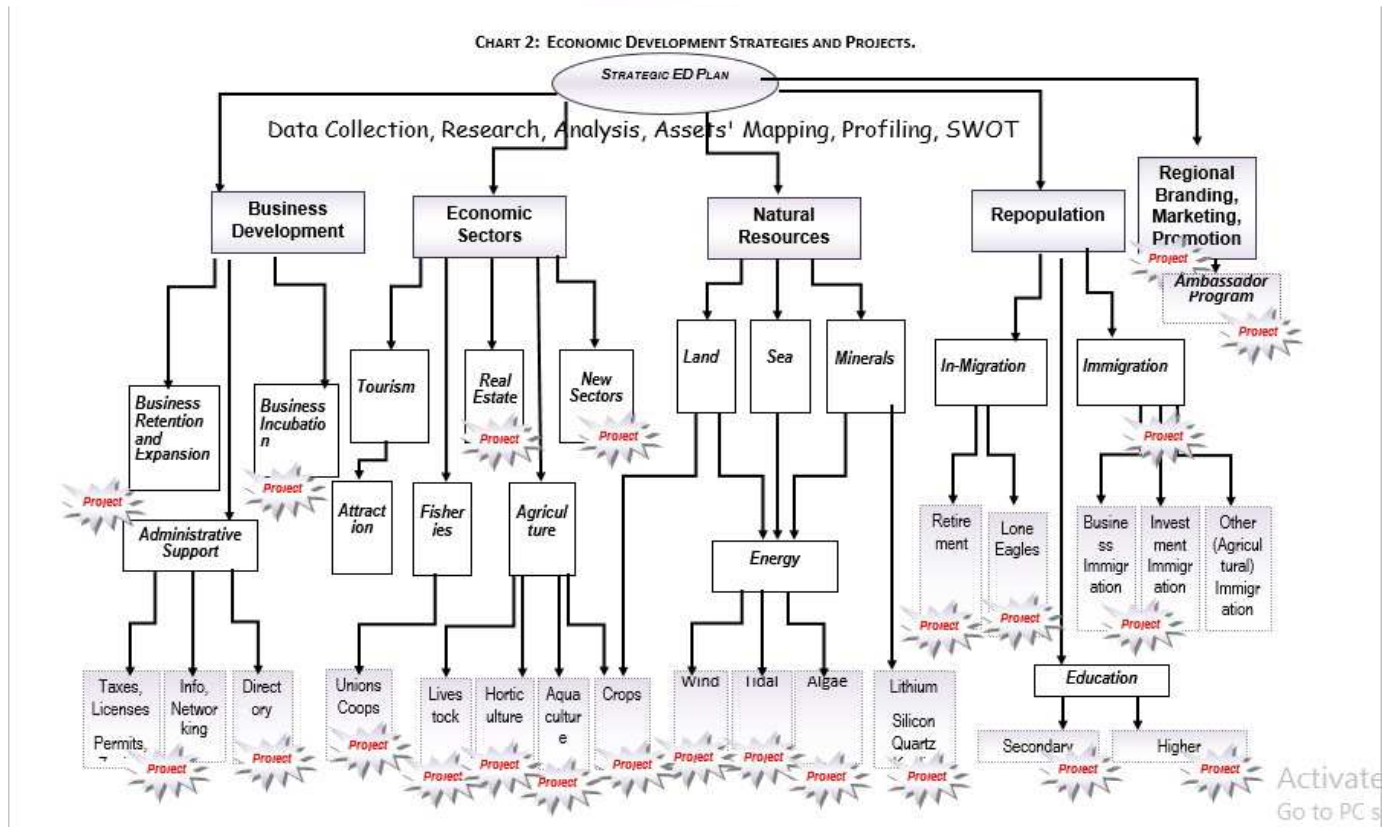
Under need-based approach governments used "a standard deficits calculations approach" to quantify community needs in order to take deficit reducing measures. Major players are governments and local administrations, major tools are support and direct investment to businesses, services, utilities.

Assets-based projects are more socially-oriented projects, the typical example being “creative class” model by Florida (2004). At its core, assets-based ED focuses on various assets (human, social, financial, natural and physical) that already exist in the region, especially the formal and informal associations that mobilize assets and strengthen the social relationships that are important for bridging local initiatives to external opportunities. Major players are local communities, major tools are local initiatives.

Currently, most of local ED strategies are formulated as a mix of need-based to assets-based approaches. Any regional strategic ED planning nowadays starts with a local data collection, assets mapping, profiling, SWOT analysis. Such research identifies key possible impact areas – business, sectors, natural resources, repopulation, region’s marketing in the Chart 2. Then based on success stories and positive experience of other regions each general direction is disaggregated down to the level of executable projects.

Chart 2 shows a typical list of the ED toolkit applied to local/regional ED in North America. This list is in no way comprehensive, but it is rather a first attempt to create a complete list of possible ED projects.

And at this point double-scoring (weighted-scoring) method comes in handy. There is no other methodology which would allow to compare and select between such extremes as business incubation and “lone-eagles” program Sopuck (2003).



PROPOSED METHODOLOGY

As mentioned above, proposed method of regional project evaluation, prioritization and selection is based on double-scoring (or weighted-scoring) scheme of budget allocation was suggested earlier for the nation-wide project evaluation and selection Mosesov, Kota (2005). In the core of this method is assignment of the two sets of scores to current public and possible alternative choices of projects.

Similar approach is used by Canadian municipalities in their annual capital budgeting plans. Tables 1 through 3 illustrate the proposed method applied at the regional level of project selection, but it can be applied at any level of authority, from national down to municipalities and rural communities.

Double-scoring method requires assessment of two sets of scores. First set contains the list of the ED priorities ranked according to their current relative importance. This set of scores is used as weights to evaluate compliance of a particular project to the set of regional ED priorities.

Regional ED policy priorities are usually clearly spelled out in regional Strategic Plans, local Integrated Community Sustainability Plans (ICSP’s) and/or other administrative documents.

In case if there is no clearly pronounced set of the ED priorities it should not be too difficult to obtain through a public survey. A questionnaire(s) containing request to assign weights of relative importance can easily be distributed among community leaders representing different interest groups and sectors. Summarizing and averaging of their responses, as well, should not be an expensive or a difficult exercise.

FIRST SET OF SCORES (Weights) evaluate local ED priorities. For the sake of simplicity, in the illustrational example only ten of potential regional ED objectives are chosen at the highest level of aggregation fig. 2, but their list may contain any number of entries, reflecting any level, scale and scope of the ED goals’ disaggregation. Among them:

FIG.2: EXAMPLE OF ASSIGNING WEIGHTS TO ED OBJECTIVES

	Public Projects	Relative Importance Ranks
A	Advise and referral services to businesses	- 10
B	Business retention and expansion (BRE)	- 9
C	Export orientation, Import substitution	- 5
D	Financial viability, Cost efficiency	- 7
E	Income generation	- 6
F	Jobs creation	- 3
G	Population retention and expansion (PRE)	- 8
H	Priority sector development	- 8
I	Workforce development	- 4
J	Impact scale: regional, sub-regional, local	- 2

Notice, that the double-scoring method does regard considerations of cost efficiency, but only as one among several other key factors, more or less equally important to all other aspects of regional concerns. For the entry in "Financial viability, Cost Efficiency" evaluators should assign relative weight to availability of funds founded on current economic, fiscal, and monetary situation.

On the quantitative side, both sets of scores in our example are scaled from one to ten, but of course, depending on required level of differentiation, it can be set at any scale from 3:1 to 100:1. Alternatively, scoring might be based on percentages or coefficients of zero through one. In our hypothetical case indicated above weights were arbitrarily assigned with exclusively presentational purposes only.

First set of scores (weights) are presented in Table 1 as the averages of respondents' evaluations (see the column "Average").

SECOND SET OF SCORES are assigned to each of projects proposed for implementation during next fiscal year. Scoring of projects is based on their level of relevancy to each and every of the above ten regional objectives. Exemplary guidelines for scores' assigning are presented in Appendix 1. Same technique of questionnaire surveys among leading professionals, administrators, etc. will produce results presented in the Table 2.

Questionnaire surveys though are not the only possible method of assigning weights. Some scores could be derived immediately from comparable quantitative indicators. For example, net present value of the project life-cycle cost can serve as a good meter for the entry in the "Financial Viability, Cost Efficiency". Even better indicator would be a cost-benefit ratio in the cases where relative cost-benefit analysis is available.

After simple weighted averaging of project scores eventually all proposals receive ultimate score as shown in the "Priority of the Project" column of the Table 2. This task is without difficulty performed by any spreadsheet software using "Sort" function (see Table 3).

In Table 3 projects are re-sorted top to bottom according to their resulting total relative scores: C, B, G, H, F, A, D, E – ranking 77.1 down to 36.3 points. Selection then should be limited to those projects which fit into next year's allocated budget. The cost of project is represented by its required annual (next year) investment outlays.

Thus, this methodology allows selecting the combination of projects that maximizes achievement of regional ED objectives within the funds available in the next fiscal year. According to results in the Table 3, regional ED priorities allocate all projects in C, B, G, H, F, A, D, E succession. Under the double-scoring (weighted-scoring) method such a choice will ensure utmost feasible realization of the current ED priorities.

It is noteworthy, that Table 3 demonstrates rather high sensitivity of the method to slight changes in priorities. One point transpose in weights between social/political progress and economic growth, accompanied with two points reverse between urban and rural development produces noticeably different results, i.e. project G moves down to the bottom, while projects H and F move up the scale changing ranks significantly.

This indicates a possibility of a change in priorities with respect to projects that require several years for their development. It is possible that project picked for execution previous year will fall below scoring threshold next year. In this case it should be put on hold until change in priorities bring it back to scope in following year's(s) evaluations (see real options' project evaluation theory). In accordance with the "real options" theory an option of abandonment or expansion of the project minimizes losses and maximizes gains in capital budgeting processes.

This is an example of how to decide a project is given with the help of key factors and the method of scoring is related with the regional ED priorities specified as in planned economies and their appropriate budgeting for the implementation of services for the benefit of stakeholders.

TABLE 1: ASSIGNING SCORES (WEIGHTS) TO THE REGIONAL ED PRIORITIES

#	Priority\Person	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7	Average
A	Advise and referral services to businesses	5	6	9	9	10	1	6	7
B	Business retention and expansion (BRE)	5	3	4	3	4	3	7	4
C	Export orientation, Import substitution	9	9	3	8	4	9	1	6
D	Financial viability, cost efficiency	3	3	4	6	0	2	6	3
E	Income generation	9	7	8	3	9	10	9	8
F	Jobs creation	7	3	4	1	4	3	7	4
G	Population retention and expansion (PRE)	10	9	3	8	4	9	1	6
H	Priority sector development	4	1	8	6	0	2	6	4
I	Workforce development	2	7	8	3	9	10	9	7
J	Impact scale: regional, sub-regional, local	10	10	10	10	10	10	10	10

TABLE 2: PROJECT EVALUATION ACCORDING TO REGIONAL ED PRIORITIES

Projects	Advise and referral services to businesses	Business retention and expansion (BRE)	Export orientation, Import substitution	Financial viability, Cost efficiency	Income generation	Jobs creation	Population retention and expansion (PRE)	Priority sector development	Workforce development	Impact scale: regional, sub-regional, local	Priority of the Project
	7	4	6	3	8	4	6	4	7	10	
A	4	5	10	10	9	10	6	7	3	0	57.4%
B	10	8	7	0	7	7	8	2	6	5	63.3%
C	9	10	7	10	8	9	1	10	5	10	77.1%
D	4	8	9	4	0	0	10	8	4	5	50.5%
E	1	10	7	1	6	10	0	3	3	0	36.3%
F	10	0	2	0	8	6	2	2	10	10	59.8%
G	0	3	8	10	6	1	7	10	6	10	62.6%
H	4	7	10	3	0	3	7	4	10	10	62.0%

TABLE 3: LIST OF PROJECTS REARRANGED ACCORDING TO REGIONAL PRIORITIES' SCORE

Projects	Advise and referral services to businesses	Business retention and expansion (BRE)	Export orientation, Import substitution	Financial viability, Cost efficiency	Income generation	Jobs creation	Population retention and expansion (PRE)	Priority sector development	Workforce development	Impact scale: regional, sub-regional, local	Priority of the Project
	7	4	6	3	8	4	6	4	7	10	
C	9	10	7	10	8	9	1	10	5	10	77.1%
B	10	8	7	0	7	7	8	2	6	5	63.3%
G	0	3	8	10	6	1	7	10	6	10	62.6%
H	4	7	10	3	0	3	7	4	10	10	62.0%
F	10	0	2	0	8	6	2	2	10	10	59.8%
A	4	5	10	10	9	10	6	7	3	0	57.4%
D	4	8	9	4	0	0	10	8	4	5	50.5%
E	1	10	7	1	6	10	0	3	3	0	36.3%

CONCLUSIONS

Decision methods on budgeting under capital rationing are well established primarily for a private sector.

Public sector projects are usually evaluated based on quantification of intangible costs and benefits which involves difficulties of monetization of non-marketed indirect benefits and costs.

Double-scoring (weight-scoring) method is suggested for this case rather common for public authorities. Evaluation and ranking among projects is accomplished through assignment of weights to each project. These weights reflect level of correspondence of each particular project towards accomplishment of regional ED priorities.

This method was test-run both at national (Kuwait) level, and at a regional level (South-West Nova, Canada). It proved to be a simple, but reliable tool of prioritizing of public projects. The model is applicable at all levels of public administration from a community to a nation as well as internationally.

LIMITATIONS

Particular difficulty is in budget allocation between public projects of complete difference, such as projects addressing environmental, educational, or health problems. While costs in all cases are clearly spelled by investment outlays, benefits of better education vs. cleaner environment are hardly comparable.

SCOPE FOR FURTHER RESEARCH

Scope for further research exists in environmental, education and health sectors projects where more than tangible benefits qualitative benefits are visible and most of the times the gestation gaps between the project implementation and realization of benefits take long period. It can be tested whether this analysis is able to evaluate the benefit related project prioritization. Comparative studies between projects in developed and under developed regions would be interesting.

LIST OF ABBREVIATIONS

ED	Economic Development
CBA	Cost Benefit Analysis
ERG	Efforts-Results Grid
WtP	Willingness-to-Pay
IRR	Internal Rate of Return
NPV	Net Present Value

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APPENDIX

Exemplary Guidelines for Project Evaluations' Scoring

There are two major approaches depending on whether criteria of scoring are quantifiable or not.

Quantitative scores are based on corresponding profile indicators:

1. "Income generation":

Based on median income and size of business. With median income in the area of approximately \$30,000 and size of business of around 10 employees, generation of \$300,000 in annual salaries per business could be accepted as a middle point (a score of 5). Then on such a scale any business paying \$600,000 and more in salaries gets a score of 10, while business paying \$50,000 in salary scores the bottom 1 and so on.

2. "Jobs creation and Business retention and expansion (BRE)":

Based on scale of employment at local businesses. About 99% of local businesses employ from 1 to 100 workers. Hence, the number of new jobs created divided by 10 can serve as a score, for example: 20 jobs give a score of 2, 50 jobs – 5, 100 and more jobs – a score of 10.

3. "Population retention and expansion (PRE)":

Based on rates of depopulation. South West Nova has lost 2,500 residents in between two last censuses (2006-2011), or around 500 a year and 50 people per municipality. Full recovery of 50 residents then could be accepted as a 100% accomplishment, or 10 points. Correspondingly, 10 persons retention earns 2 points, 20 – 4 points, etc.

4. "Impact scale: regional, sub-regional, local":

Based on equal incremental increase of importance: local – 3 points, sub-regional – 6 points, regional – 10 points.

Qualitative scores are based on one of three options:

1. Criteria "yes" – 10 points, or "no" – 0 points. Includes:

- ✓ "Advise and referral services to businesses"
- ✓ "Export orientation, Import substitution"

2. Criteria "yes" – 10 points, "somewhat" – 5 points, or "no" – 0 points. Includes:

- ✓ "Financial viability, cost efficiency"
- ✓ "Priority sector development"
- ✓ "Workforce development"