

QUANTIFYING PRIORITY IN WOMEN'S DECISION-MAKING

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Abstract. This paper investigates the degree of emphasis given on each of nine criteria normally considered by working women in their everyday decision-makings. It attempts to quantify the degree of how one criterion is more important than the other. A method of deriving weight for each criterion that takes into consideration the raw weight and variation in the data is suggested. The data analyzed is based on a case study on ratings of importance of nine formulated criteria conducted on 340 academic and supporting women staff of Universiti Teknologi MARA in Shah Alam. This study provides an actual scenario on how working women put their priorities, when faced with various criteria in decision-making. Such inputs are valuable to policy makers and other relevant authorities in the planning of development programmes and in the making of new policies for working women. A brief discussion of criteria formulation is also included. Findings of the study reveal that different group of women placed different priority in their decision-making. The academic group placed feminine role as their top priority and the non-academics perceived economic role as the top priority in their decision-making.

Keywords: Decision making, criteria, weight, working women

Abstrak. Kertas ini menyelidiki darjah keutamaan yang diberikan ke atas setiap sembilan kriteria yang biasanya dipertimbangkan oleh wanita bekerja dalam membuat keputusan harian mereka. Di sini kami cuba mengkuantitikan darjah kepentingan sesuatu kriteria dibanding dengan yang lain. Kaedah mendapatkan pemberat bagi setiap kriteria yang mengambilkira pemberat mentah/asal dan variasi dalam data dicadangkan. Data mengenai skor kepentingan kriteria diperoleh daripada 340 kakitangan akademik dan sokongan wanita Universiti Teknologi MARA di Shah Alam. Kajian ini memberi gambaran sebenar bagaimana wanita bekerja meletakkan keutamaan apabila berdepan dengan pelbagai kriteria dalam mereka membuat sesuatu keputusan. Maklumat seperti ini amat bernilai kepada pembuat polisi dan pihak berkuasa yang relevan dalam merancang program pembangunan dan merangka polisi baru bagi wanita di sektor pekerjaan. Perbincangan ringkas mengenai rumusan kriteria juga disertakan. Dapatan kajian menunjukkan wanita dari kumpulan yang berlainan meletakkan prioriti yang berbeza semasa membuat keputusan. Didapati wanita dari kumpulan akademik meletakkan peranan kewanitaan sebagai yang paling penting manakala kumpulan bukan akademik merasakan peranan ekonomi sebagai kriteria paling penting semasa membuat keputusan.

Kata kunci: Pembuatan keputusan, kriteria, pemberat, wanita bekerja

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1.0 INTRODUCTION

Making decision is part and parcel of our lives. We make decisions everyday, be it related to our business enterprise, our career, or closest to us, our family life. Thus, decision-making is an important everyday agenda.

Decision-making is an aspect that has long been researched by scholars from various fields. In most cases, studies have focused on decision-making in the field of management, engineering designs, business strategies and even in politics. Unfortunately, not much has been said about our everyday individual decision-making particularly among working women.

As women are becoming more educated, more are employed. Being employed requires women to shoulder multiple roles responsibility as paid workers and mothers. The multiple-role demand often leads to role-conflict – a conflict between a life centered on a career, that is, the demands of a continuous, full-time job, and a life centered on family, that is, the demand of child-bearing and child-rearing (Hakim, 2000) which cause women to face the dilemma of balancing between work and family commitments (Perry-Jenkins, Repetti & Crouter 2000). According to Thoits (1992) (as cited in Perry-Jenkins, 2000: 990) and Callero (1985), role systems are inherently hierarchical and the problem of juggling roles requires favoring one role over another. In contrast, Marks and MacDermid (1996) proposed that although this is how roles may be organised for some, “role balance”, where roles are given relatively equal attention and weight, may be optimal for many. This phenomenon to a certain extent will have an impact on the way women make decisions in their everyday life.

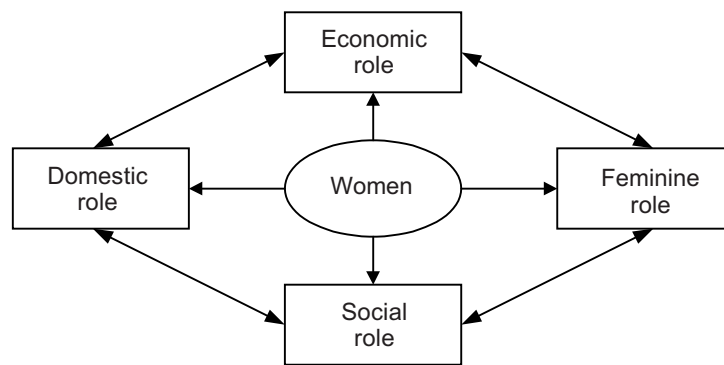
Lloyd (1991) found that women today are becoming more participative in major household decision-making. Her finding shows that women’s voices are becoming more prominent. This could be due to the fact that women have become more educated and they have gained economic independence. Since women are active agents of decision-making, certain aspects of their decision-makings need to be studied. This paper explores two related questions about women’s decision-making. First, what are the criteria that they normally consider when they make a decision? Second, how much emphasis is given on each criterion, that is, how much one criterion is more important than the other?

The first section of this paper discusses briefly the criteria normally considered by working women when they make a decision. The section that follows illustrates methods of deriving weights for the criteria.

2.0 PERSPECTIVES IN WOMEN’S DECISION-MAKING

Various aspects/perspectives in the daily decision-making of working women is elaborated in a study by Puzziawati, Abdul Aziz, Ahmad Mahir and Wan Norsiah (2002). Criteria, which are normally weighed by working women when they make

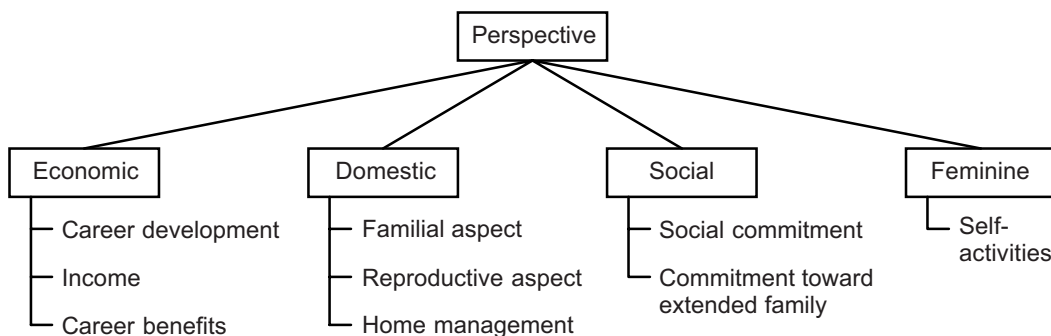
decision, are determined based on theoretical and empirical studies related to women's multiple roles (see: Voydanoff & Donnelly, 1999a; Marks & MacDermid, 1996; Noor Aini Khalifah *et al.*, 1996; Baruch & Barnett, 1986; Callero, 1985; Jamilah Ariffin, 1992; Hamidah Hussain, 1974). Puzziawati *et al.* (2002) viewed women's multiple roles from four main perspectives: economic, domestic, social and femininity. A schematic diagram on the authors' view of women's multiple roles is illustrated in Figure 1.



Source: Puzziawati, Abdul Aziz, Ahmad Mahir & Wan Norsiah (2002)

Figure 1 Women's multiple roles

Formulation of these criteria are also motivated by the idea of integrating different aspects of multiple roles and issues highlighted in studies related to women and work (see: Perry-Jenkins, Repetti & Crouter, 2000; Mackey & Coney, 2000; Bielby & Bielby, 1988; Wook Endut, 1996). For economic perspective, three criteria are formulated: career development, income and career benefits. Three criteria are also considered for domestic perspective: familial aspect (for example, time spent with spouse, children, parents and in-laws), reproductive aspect (for example, number of



Source: Puzziawati, Abdul Aziz, Ahmad Mahir & Wan Norsiah (2002)

Figure 2 Criteria in women's decision-making

children, birth spacing, etc.) and home management (for example, house cleanliness, paying bills, food for family, groceries, etc). As for social perspective, two criteria are formulated: commitment towards society and extended family members. With regard to feminine perspective, women indulging in self-activity (for example, time spent exercising, grooming, hobbies, etc.) are formulated as a criterion. Hence, nine criteria are formulated as illustrated in Figure 2 and tabulated in Table 1. These are assumed to be criteria usually weighed by working women when they make a decision.

Table 1 The nine formulated criteria

Criterion	Criterion description
C1: career	A criterion associated with career development
C2: family	A criterion associated with familial aspect
C3: femininity	A criterion associated with women's feminine aspect such as self-grooming, health and beauty care, etc.
C4: income	A criterion associated with income
C5: social	A criterion associated with social commitments
C6: reproductive	A criterion associated with reproductive aspect (family planning)
C7: extended family	A criterion associated with extended family commitments
C8: benefits	A criterion associated with career benefits
C9: household	A criterion associated with household management

3.0 THE DATA AND METHODS

3.1 The Data

The data collected are ratings of importance of those nine criteria shown in Table 1. A sample of three hundred and forty (340) women employees of Universiti Teknologi MARA in Shah Alam were randomly selected to participate in this study. This number represents about 10% of women employees of Universiti Teknologi MARA in Shah Alam. The respondents comprise of academic and non-academic staff.

An instrument in the form of questionnaire was designed based on the nine criteria listed in Table 1. Ratings of importance were measured according to a scale with a minimum value of 0 and a maximum value of 100. The method of data collection is through personal interview.

3.2 Method of Deriving Criterion Weight

Multiple criteria typically have varying importance. The purpose of weight is to express the importance or preference of each criterion relative to other criteria. Weights are important measures in quantifying the relative importance of a criteria.

There is no one standard method in developing a criterion weight although many methods have been developed (Mendes, 2001). Various methods of determining weights in multiple criteria have also been discussed by Abdul Aziz (2002) that include assigning weights based on correlation matrix and coefficient of variation. In this paper, only weights based on correlation matrix is used and the results are compared with the conventional approach of using mean.

3.2.1 Weights Based on Correlation Matrix

If criteria are significantly correlated among each other, weights assigned must take into account the size of correlation among those criteria (Abdul Aziz, 2002). Criteria weights obtained based on correlation matrix are assumed to be proportional to the respective row (column) sums of the absolute values of correlation coefficients (Ray, 1989). Assuming there are k criteria, weight for j th criteria is formulated as follows:

$$w_j = \frac{r_j}{\sum_{j=1}^k r_j} \quad \text{and} \quad r_j = \sum_l |r_{jl}| \quad (j = 1, 2, \dots, k) \quad (1)$$

where r_{jl} is the correlation coefficient between j th and l th criteria that measures the degree of the relationship between criterion j and criterion l .

w_j : weight of j th criterion and $\sum_{j=1}^k w_j = 1$ where $w_j \geq 0$.

x_{ij} : rating score of observation i based on j th criterion, $i = 1, \dots, n$ and $j = 1, \dots, k$.

r_{ij} : correlation coefficient between j th and l th criteria.

$$r_{ij} = \frac{\text{cov}(x_j, x_l)}{(\sqrt{s_{jj}} \sqrt{s_{ll}})} \quad \text{where} \quad \text{cov}(x_j, x_l) = s_{jl} = \frac{1}{n-1} \sum_{i=1}^n (x_{ij} - \bar{x}_j)(x_{il} - \bar{x}_l) \quad \text{and}$$

$$s_j^2 = s_{jj} = \frac{1}{n-1} \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2, \quad \text{the variance, and} \quad \bar{x}_j = \frac{1}{n} \sum_{i=1}^n x_{ij} \quad \text{is the mean.}$$

3.2.2 Weights Based on Mean

$$w_j = \frac{\bar{x}_j}{\sum_{j=1}^k \bar{x}_j} \quad (2)$$

4.0 ANALYSIS AND FINDINGS

For the data set in this study, each criterion has the same unit of measurement. The variances among the criteria are not significantly different. Hence, standardization of the data is not necessary (Abdul Aziz, 2002).

Criteria weights are calculated based on all respondents (N=340) and also based on academic (n=190) and non-academic group (n=150). Comparisons are made among the academics and non-academics in terms of criteria preference.

Correlations among criteria ratings for all respondents, academics and non-academics are shown in Tables 2, 3, and 4 respectively. Some criteria are significantly correlated among each other in all cases.

Table 2 Correlation coefficient matrix among criteria (for all respondents)

	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1	0.168	0.219	0.299	0.193	0.129	0.052	0.366	0.176
C2	0.168	1	0.479	0.058	0.103	0.095	0.290	0.269	0.443
C3	0.219	0.479	1	0.248	0.367	0.229	0.429	0.441	0.387
C4	0.299	0.058	0.248	1	0.422	0.266	0.157	0.306	0.127
C5	0.193	0.103	0.367	0.422	1	0.197	0.356	0.198	0.321
C6	0.129	0.095	0.229	0.266	0.197	1	0.371	0.346	0.210
C7	0.052	0.290	0.429	0.157	0.356	0.371	1	0.353	0.383
C8	0.366	0.269	0.441	0.306	0.198	0.346	0.353	1	0.367
C9	0.176	0.443	0.387	0.127	0.321	0.210	0.383	0.367	1

Note: Correlation coefficients of value 0.127 and higher are significant

Table 3 Correlation coefficient matrix among criteria (for academics)

	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1	0.023	0.145	0.277	0.142	0.102	0.050	0.276	0.127
C2	0.023	1	0.404	0.003	0.170	0.056	0.307	0.168	0.561
C3	0.145	0.404	1	0.252	0.433	0.219	0.410	0.425	0.431
C4	0.277	0.003	0.252	1	0.324	0.284	0.087	0.325	0.011
C5	0.142	0.170	0.433	0.324	1	0.116	0.302	0.126	0.266
C6	0.102	0.056	0.219	0.284	0.116	1	0.311	0.337	0.084
C7	0.050	0.307	0.410	0.087	0.302	0.311	1	0.330	0.384
C8	0.276	0.168	0.425	0.325	0.126	0.337	0.330	1	0.319
C9	0.127	0.561	0.431	0.011	0.266	0.084	0.384	0.319	1

Note: Correlation coefficients of value 0.145 and higher are significant

Table 4 Correlation coefficient matrix among criteria (for non-academics)

	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1	0.348	0.335	0.335	0.257	0.170	0.052	0.502	0.238
C2	0.348	1	0.623	0.156	0.048	0.179	0.292	0.432	0.308
C3	0.335	0.623	1	0.215	0.258	0.207	0.442	0.454	0.296
C4	0.335	0.156	0.215	1	0.527	0.200	0.240	0.255	0.265
C5	0.257	0.048	0.258	0.527	1	0.273	0.415	0.273	0.366
C6	0.170	0.179	0.207	0.200	0.273	1	0.449	0.325	0.366
C7	0.052	0.292	0.442	0.240	0.415	0.449	1	0.374	0.358
C8	0.502	0.432	0.454	0.255	0.273	0.325	0.374	1	0.414
C9	0.238	0.308	0.296	0.265	0.366	0.366	0.358	0.414	1

Note: Correlation coefficients of value 0.170 and higher are significant

Tables 5, 6, and 7 show the weights based on means and correlation matrix for all respondents, academics and non-academics respectively.

Table 5 Criteria weights (for all respondents)

Criteria	Basics for determination of weights		Weights based on:	
	x_j	r_j	Mean	Correlation
C1	77.136	2.602	0.116	0.091
C2	87.303	2.905	0.131	0.101
C3	78.077	3.799	0.117	0.133
C4	64.394	2.883	0.097	0.101
C5	57.944	3.157	0.087	0.110
C6	67.737	2.843	0.102	0.099
C7	69.722	3.391	0.107	0.118
C8	79.555	3.646	0.120	0.127
C9	81.889	3.414	0.123	0.119

Table 6 Criteria weights (for academics)

Criteria	Basics for determination of weights		Weights based on:	
	x_j	r_j	Mean	Correlation
C1	77.300	2.142	0.118	0.082
C2	88.290	2.692	0.135	0.103
C3	76.739	3.719	0.117	0.142
C4	62.213	2.563	0.095	0.098
C5	56.035	2.879	0.086	0.110
C6	65.255	2.509	0.100	0.096
C7	69.722	3.181	0.106	0.122
C8	78.644	3.306	0.120	0.126
C9	80.606	3.183	0.123	0.122

Table 7 Criteria weights (for non-academics)

Criteria	Basics for determination of weights		Weights based on:	
	x_j	r_j	Mean	Correlation
C1	77.010	3.237	0.113	0.103
C2	86.303	3.386	0.127	0.108
C3	79.840	3.830	0.117	0.122
C4	67.210	3.193	0.099	0.101
C5	60.458	3.417	0.089	0.108
C6	71.098	3.169	0.105	0.101
C7	73.453	3.622	0.108	0.115
C8	80.867	4.029	0.119	0.128
C9	83.752	3.611	0.123	0.115

Ranking of criteria based on the weights obtained using both methods are presented in Table 8.

Table 8 Ranking of criteria

Criteria importance (in desc. order)	All respondents		Academics		Non-academics	
	Based on mean_wt	Based on corr_wt	Based on mean_wt	Based on corr_wt	Based on mean_wt	Based on corr_wt
1	C2	C3	C2	C3	C2	C8
2	C9	C8	C9	C8	C9	C3
3	C8	C9	C8	C7 & C9	C8	C7 & C9
4	C3	C7	C1	(equal rank)	C3	(equal rank)
5	C1	C5	C3	C5	C1	C2 & C5
6	C7	C4 & C2	C7	C2	C7	(equal rank)
7	C6	(equal rank)	C6	C4	C6	C1
8	C4	C6	C4	C6	C4	C4 & C6
9	C5	C1	C5	C1	C5	(equal rank)

5.0 DISCUSSION ON RESULTS

The correlation matrices show that some criteria are correlated. These are expected since the criteria are based on women's multiple roles and by theory the roles are not only interrelated in the role system but also hierarchical (Perry-Jenkins, 1990). When women weigh the importance of one criterion in their decision-making, the weighing process is assumed in relation to other criteria which is in line with the multiple role literature that addressed the interactive nature of roles (Repetti, 1998).

Based on the results presented in Table 8, and the criteria weights calculated in Tables 6 and 7, in each case, the two methods used do not produce the same preference order. This is consistent with what proposed by Mendes (2002). It is important to note that ranking of weights derived from mean ratings of criteria produce results that represent what we often think of as the norms among working women. The results show that the most important criterion is related to familial aspect (the degree of importance is higher for the academics (0.135) compared to non-academics (0.127)) followed by home management (both the academics and the non-academics have the same degree of importance with weight value of 0.123). These are two criteria domestic role.

The third important criterion is related to career benefits in which both groups have the same degree of importance. When mean weight is used the preference order is similar between the academics and non-academics except the academics weighed career development almost equally important as self-activities but the non-academics weighed femininity slightly more important than career. The result of this method further shows that social aspect is least important for both groups.

Based on mean weights calculated, both groups of women place domestic role as their top priority when they make a decision. Unfortunately this approach does not take into consideration the correlations among criteria. Each criterion is assumed to function independently in the role system, which contradicts the multiple roles literature (Repetti, 1998).

In the case of weights derived from correlation matrix, ranking of criteria shows the most important criterion among the academics is related to femininity, that is indulging in self-activities like healthcare, hobbies, self-grooming, etc. Their second most important criterion is career benefits. In decision-making of academics, feminine aspect is almost two times more important than career benefits. The case is otherwise for the non-academics, where they placed career benefits as the most important criterion followed by self-activities. Commitment towards extended family and home management are equally important criteria for both the academics and non-academics although the academics placed a slightly higher degree of importance (both criteria with weight value of 0.122 for academics and 0.115 for non-academics). Based on the correlation weights, familial and social aspects are equally important and fourth in the rank of importance among the non-academics. The academics placed social aspect as slightly more important (0.110) than familial aspect (0.103).

The non-academics perceived income and reproductive aspect as their least important criteria. Income is not perceived as important both among the non-academics and academics because most of them have fixed reliable income. This criterion may be of great concern to them.

Surprisingly, career development and reproductive aspects are two least important criteria for the academics but not the case for the non-academics. In this case study, career development and familial aspect do not surface as the most important criteria among the academics when they make a decision. Instead, feminine aspect that include self-activities is the top priority. This phenomenon may be a result of career and familial aspect as criteria in decision-making are embedded within feminine or self-activities. This may be in line with Marks and MacDermid's (1996) proposal of role treatment.

Results based on correlation weights postulate that the academics put feminine role as their top priority and the non-academics put economic role (career benefits) as theirs. The difference in priorities among the academics and non-academics is possibly due to differences in their socio-economic status. Career benefits which is perceived as most important among the non-academics is justifiable since most non-academics are supporting staff that earn less than the academic group. Therefore, benefits as alternative to financial rewards is placed as priority.

6.0 CONCLUSIONS

This paper has attempted not only to identify and quantify priorities in women's decision making but indirectly illustrates the fact that different methods of deriving

weights result in different weight values, hence different preference ordering for the same set of criteria.

Method of deriving weight based on correlation matrix is more appropriate in this case due to significant correlations among criteria. Correlations approach takes into account the sharing of information among criteria so as to avoid double contribution to calculated weights. While mean is very much influenced by outliers and extreme values, it also neglects correlations in the data. Therefore, criteria weights derived from correlation matrix are more reliable in cases of significant correlations among criteria.

Hence, based on weights derived from correlation matrix, it can be concluded that for this case study, different groups of working women put different priority in their decision-making. While the academics placed feminine role as their top priority, the non-academics perceived economic role (criteria related to career benefits) as their top priority in their everyday decision-making. Among the academics, self-activities are given two times more weight compared to career whenever they make a decision. On the other hand, the non-academics rank career benefits slightly more important than career and familial aspect.

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