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Distance between occupations in the task complexity space¹

Abstract

Using the task-based framework, this study measures the level of skill transferability across occupations by building an occupational distance measure. The distance measure allows us to compare occupations in terms of their task profiles. Skill transferability between two occupations is high if the occupations are 'close' with each other and low if occupations are 'far' from each. In addition, the distance measure allows us to classify which occupational moves are considered an upskilling, down-skilling or lateral occupational moves. The occupational distance measure is also applied to the sample of TVET graduates to measure their level of occupational mobility pre- and post-training. This has important implications in terms of the amount of additional training and education needed by individuals to move from one occupation to another. This study constitutes a basis for further studies on understanding the relationship among occupational distances, mobility and wage differentials in different economies.

JEL Classification: J24, J62

Keywords: Tasks, Skills, Human Capital, Occupational Mobility, Occupational Distance

The changing labor market environment brought about by globalization and the advent of the fourth industrial revolution (4IR) calls for better understanding of the extent of skill transferability. Individuals working in a particular occupation, belonging to a specific industry and sector must reconsider other opportunities outside their current work arrangement. Thus, workers need to retool and reskill by engaging in retraining and education to better adapt to the evolving occupations and emergence of new occupations.²

Measuring the extent of skill transferability revolves around the notion of human capital specificity. Skills may be transferable only across industries [Neal (1995); Parent (2000)], across firms [Becker 1993(1964)] or even across occupations [Kambourov and Manovskii 2009] making human capital industry-, firm- and occupation-specific, respectively. This means that regardless of occupational mobility, human capital can be preserved at different levels depending on one's view on specificity.

The task-based framework treats occupations not as discrete categories but rather as bundles of tasks.³ This approach views human capital as task-specific which implies that the productivity of certain skills in an occupation is lost when a different skillset is required to perform the tasks in the new occupation. In other words, unlike occupation-specific skills, when individuals change occupations, their human capital is not fully lost if they continue to perform similar tasks in their

¹ This paper draws heavily from Generalao [2019a], an unpublished master's thesis, which builds an occupational distance measure and uses it as a proxy for a training-job mismatch measure.

² See Khatiwada and Veloso (2019). New technology and emerging occupations: Evidence from Asia.

³ The assignment of skills to tasks depends on labor market prices and is considered endogenous in the model. The use of tasks as proxies for unobserved worker skills and the assumption that skill prices are constant are developed by Autor et al. [2003], Ingram and Neumann [2006], and Autor and Handel [2013]. Yamaguchi [2012] challenges this assumption stating that skill prices vary by the complexity of the task in a given occupation.

new occupation. For example, a carpenter who decides to become a cabinet maker does not lose human capital in the process since he will still perform tasks of the same nature in his new occupation. The opposite can happen if the carpenter becomes a machine operator where much of his task-specific human capital will be left unused and will depreciate.

One of the applications of the task-based approach is measuring the degree of similarity between occupations in terms of their task contents [(Polataev and Robinson [2008]; Gathmann and Schönberg [2010]; Nedelkoska et al. [2015]; Robinson [2018]). This paper builds an occupational distance measure to estimate this magnitude using the task profiles developed by Generalao [2019b]. Comparing occupations using this measure allows us to identify which occupations are 'close' or 'far' from each other and to determine how similar or different occupations are from each other. We apply the task-based framework to examine the degree of skill transferability across occupations and specifically in the sample of vocational training. Skill transferability between two occupations is high if the occupations are similar in their skill vectors which are derived from the tasks performed in the occupation. It implies that a move from, say, occupation A to B, will incur little to no costs for the individual. On the other hand, low skill transferability between two occupations is deemed to be a skill mismatch which is both costly to the individual in monetary and nonmonetary terms.

Related literature

Several studies (Polataev and Robinson [2008]; Lazear [2009]; Gathmann and Schönberg [2010]; Nedelkoska et al. [2015]; Bechichii et al. [2018]) have built measures of distance between jobs in terms of the underlying skills and tasks that these jobs require. These distance measures are constructed from the task portfolios describing the nature of the tasks performed in the occupation.

Robinson [2018] identifies two approaches in the task-based literature that are used in constructing the distance measure. The first one uses a relatively small number of skills or task measures such as that of Gathmann and Schönberg [2010] while the other one uses factor analysis or principal component analysis to extract a smaller number of task measures from a larger dimension vector of measures (Polataev and Robinson [2008]; Robinson [2018]).

Three data sets are prominently cited in the task-based literature. These are (1) US O*NET, (2) Germany's QCS and (3) The Survey of Adult Skills by the PIACC. The first and third datasets have been used in the second approach. O*NET was developed by the U.S. Department of Labor to provide standardized occupational information for an employment service which matches job applicants with job openings. It contains a multitude of occupation characteristics with detailed definitions and that are rated using a multipoint scale. These are converted to task scores for each occupation using factor analysis and principal component analysis. The Survey of Adult Skills by PIACC is a recent survey which "measures adults' proficiency in key information-processing skills literacy, numeracy and problem solving in technology-rich environments and gathers information and data on how adults use their skills at home, at work and in the wider community." On the other hand, Gathmann and Schönberg [2010] use 19 task indicators and aggregate them to three task classifications. Survey scores for each classification comprise the task portfolio of each occupation.

The distance measures based on the two approaches still have drawbacks. For the distance measure constructed using the first approach, Bechichii et al. [2018] point out its failure to take into consideration the relative importance of skills in an occupation. In a similar vein, although the distance measure by Poletaev and Robinson [2008] using factor analysis is computationally simple, its lack of accounting for the direction of the skill change (upskilling or down-skilling) makes it problematic. Both measures are symmetric in nature and are indifferent towards the possible differences between occupations in terms of the absolute intensity of skill requirements. As noted by Bechichii et al. [2018], managers and salespeople may both be using their negotiation skills intensively, say in 70 percent of all their tasks, but the absolute intensity of their skill requirements is not the same. That is, managers require higher levels of negotiation skills than salespeople do.

Nedelkoska et al. [2015] introduce a distance measure of skill similarities between occupations that takes into account not just the magnitude of the distance but also the direction (that is, either upward or downward) of the occupational move. However, the validity of years of schooling as proxy for the complexity of the skills needed for the occupation remains debatable. One might argue that acquiring skills is not only attributed to schooling but also to the learning-by-doing effects of continuous work measured by work experience.

Occupational distance measure

To derive an occupational distance measure, we begin by adopting the task profiles of occupations by Generalao [2019b]. Table 1 below illustrates the task profiles of 14 of the 424 occupations. It tells us the intensity of an occupation in terms of performing different task types (non-routine analytical, routine manual, etc.) relative to the other occupations. The numbers in each table entry are normalized task scores from the relative proportion of each task type in each occupation.⁴

Note that the task types will vary depending on the literature being adapted in the methodology. For instance, Ingram and Neumann [2006] categorize skills into (1) intelligence, (2) clerical, (3) fine motor and (4) strength. From the five-task classification scheme of Autor et al. [2003], Spitz-Oener [2006], Antonczyk et al. [2009], the non-routine analytical is combined with non-routine interpersonal to form category (1) while routine cognitive fits the category (2). Non-routine manual skills are linked to category (3), while routine manual requires strength in general. Gathmann and Schönberg [2010] categorize task types into another different set of task types which are cognitive, manual or interpersonal. Similar to Gathmann and Schönberg [2010], Autor and Handel [2013] also adopt three broad task categories which are abstract, routine and manual. Following Autor and Handel [2013], this paper reduces the five classifications to these three. Non-routine analytical and interpersonal skills are collapsed to abstract skills. Non-routine manual skills represent manual skills. Routine manual and cognitive skills determine the routine task category.

⁴ See Generalao [2019b] for the detailed methodology.

Table 1. Task profiles of selected occupations using the five-task classification scheme

PSOC	occupation	non-routine analytical	non-routine interpersonal	non-routine manual	routine manual	routine cognitive
2411	Accountants	2.237	-0.742	-0.745	-0.438	-0.472
4311	Accounting and Bookkeeping Clerks	-0.128	-0.742	-0.745	-0.438	1.935
3313	Accounting Associate Professionals	0.923	-0.017	-0.745	-0.438	0.271
2655	Actors	-0.329	1.743	-0.745	-0.438	0.101
3343	Administrative and Executive Secretaries	-0.829	0.345	-0.745	-0.438	1.757
2431	Advertising and Marketing Professionals	2.286	-0.259	-0.745	-0.438	-0.918
1222	Advertising and Public Relations Managers	0.047	2.520	-0.745	-0.438	-0.918
1343	Aged Care Services Managers	0.572	1.433	-0.745	-0.438	-0.561
1311	Agricultural and Forestry Production Managers	0.631	1.433	-0.745	-0.438	-0.621
7233	Agricultural and Industrial Machinery Mechanics and Repairers	-0.829	-0.742	0.583	0.221	0.610
3142	Agricultural Technicians	1.118	-0.259	0.288	-0.438	-0.918
7127	Air Conditioning and Refrigeration Mechanics	0.047	-0.742	0.805	-0.438	-0.027
3154	Air Traffic Controllers	0.047	0.345	0.030	-0.438	-0.027
3155	Air Traffic Safety Electronics Technicians	0.728	0.225	-0.745	-0.438	0.271

Source: Selection section of Table 12, Generalao [2019b] p.12

Distance measure

This paper follows Robinson [2018] in defining the distance between occupations. The distance between occupations is the measure of how different occupations are from each other based on the skill vector derived from their task contents. It explains the magnitude of the scaling up or down of the entire task portfolio in terms of a one standard deviation change in all the skill components. For example, a move from being a cabinet maker to a call center agent is generally a scaling up in terms of cognitive and interpersonal skills and a scaling down in terms of non-routine manual or finger dexterity related skills.

The normalized task scores from Table 1, and the remaining occupations, will serve as the vector of factor task scores as proposed by Robinson [2018].⁵

The distance measure of an individual moving from occupation A to B is defined as:

$$Euclidean Distance_{AB} = (\sum_{k=1}^n (x_{Bk} - x_{Ak})^2)^{0.5} \quad (1)$$

where x_{Bk} is the factor score of occupation B in terms of the k th factor.

The number of factors, n , depends on which task classification scheme is adopted.

We simply substitute the task scores in Equation 1 and compute for the distance between the two occupations.

⁵ See also Nedelkoska et al. [2015].

Direction measure

Assigning a direction is needed to classify a move from working as a cabinet maker to a call center agent as either upskilling, down-skilling or a lateral move. While the distance measure estimates the absolute difference between two occupations, the sign of the direction measure determines whether an occupational move is an upskilling or down-skilling. A positive sign means that the mobility involves upskilling and suggests human capital accumulation. A negative sign implies human capital loss from the down-skilling move. Thus, the direction of an occupational move is crucial when analyzing occupational moves. So far, only Nedelkoska et al. [2015] and more recently Robinson [2018] attempt to incorporate the direction of an occupational move in analyzing mobility [Bechichii et al. 2018]. This study also attempts to define the direction measures that will be paired with the formulated distance measure.

Robinson [2018] uses two direction measures and pairs them with the distance measure. The first direction measure is a simple unweighted sum of the differences between components of factor scores.

$$Unweighted\ Direction_{AB} = \sum_{k=1}^n (x_{Bk} - x_{Ak}) \quad (2)$$

This is a crude measure but is computationally simple. However, this assumes that each task type has equal weights in terms of skill level for an occupation which might be debatable since some task types are more complex, productive or rewarded differently.

The second direction measure is weighted. Robinson [2018] applies weights for each task type based on its relative importance in wage determination. It makes sense to determine the direction of an occupational move based on the productivity of each task type as reflected by their relative importance in predicting wages.

To explore the relationship between task-specific skills and wages, we first estimate a maximum likelihood Heckman selection model. Ordinary Least Squares (OLS) regression can suffer from sample selection bias since only those who are working and receiving wages are observed in the sample. Assumption of random employment may not be true for any individual. Ignoring this issue could lead to overestimation of returns to schooling and task-specific skill scores. There are several other individual attributes (years of schooling, unobserved ability, age, etc.) and labor market factors (unemployment, GDP, productivity, etc.) that may likely influence the employment of a worker. Thus, we run a selection model first (Equation 3) with these characteristics as covariates to being selected in the main model (Equation 4).

Selection model

$$employed_i = \beta_0 + \beta_1 reg(unemp)_{ij} + \beta_2 \log(rgdg)_{ij} + \beta_3 \log(rlabprod)_{ij} + \beta_4 workexp_i + \beta_5 workexp_i^2 + \beta_6 educattainment_i + \epsilon \quad (3)$$

Wage Regression

$$\log(wages)_{io} = \beta_0 + \beta_1 demographic_i + \beta_2 task\ scores_{io} + \beta_3 region_i + \beta_4 public_{io} + \epsilon \quad (4)$$

The coefficients of each task type, β_2 , are the weights for the corresponding task type. The subscript j corresponds to the regional characteristics where the i th individual is working in occupation o .

We use the merged Labor Force Survey – Family Income and Expenditure Survey (LFS-FIES) 2015 data of PSA to determine the individual worker characteristics of full-time and permanent workers such as monthly wage, current primary occupation, years of education, sex, age and location. We also added labor market characteristics such as regional unemployment, gross domestic product and labor productivity obtained from official statistics reported by the PSA. Different specifications are tested.

The weighted approach leads to the direction measure:

$$Weighted\ Direction = \sum_{k=1}^n \beta_k (x_{Bk} - x_{Ak}) \quad (5)$$

where β_k is the corresponding weight of task type k .

Overall occupational distance measure

The overall occupational distance measure is simply the product of the distance measure and the chosen direction measure (Equation 4.5). That is, the value derived from Equation 4.1 is multiplied with the computed value from either Equation 4.2 or 4.5 depending on the direction measure of choice.

$$Overall\ Occupational\ Distance = Distance * Direction \quad (6)$$

Analyses of results

This section is divided into three parts. The first part discusses the results from the maximum likelihood Heckman selection regression to derive the weighted direction measure described in the previous section. It is followed by the presentation of the calculated overall occupational distance measures for two occupations, namely an accountant and a garbage and recycling collector. Finally, the occupational distance measure is applied to a sample of TVET graduates.

Weights of the direction measure

One type of the direction measure is the weighted one as described in Equation 5. This subsection explains how to derive this measure which will be paired with the distance variable computed in the preceding section. From Equation 5, β_k represents the weights of the k th task type. To derive these weights, we employ a Heckman sample selection regression⁶ following the specification in Equations 3 and 4 using the LFS-FIES 2015 as the data source. The coefficient estimates of the task types in the regression will serve as the weights.

Table 2 summarizes the coefficient estimates of each task type. The negative coefficients are not unusual in the literature. Both Autor and Handel [2013] and Ingram and Neumann [2006] in the earlier periods of their analyses, obtained negative coefficients for some task types. Autor and Handel [2013] justify these negative returns by offering some theoretical propositions stating some conditions where it might remain valid. These include, “the cross-occupation covariance

⁶ The sample selection bias from running OLS regressions is confirmed by the Ramsey’s Regression Specification Error Test (RESET).

among task returns cannot be uniformly positive across all task pairs” [Autor and Handel: S67]. Also, although there are some task type variables which are insignificant predictors of wages, we still use these estimates since not all variables in the literature tackling the returns to task-specific skills are robustly significant in all specifications. As such, the coefficient estimates presented in Table 2 will serve as the corresponding weights of each task type. These weights will be plugged in Equation 5 to derive the weighted direction measures.

Alternatively, the results presented in Table 2 can be interpreted as the returns to skills.⁷ The first column of Table 2 tells us the returns to task-specific skills classified into non-routine analytical, non-routine interpersonal, non-routine manual, routine manual and routine cognitive. Out of the five, non-routine interpersonal and routine manual turn out to be insignificant predictors of wage variation. Holding all other things constant, a one-standard deviation increase in non-routine analytical task score leads to a 19.67 percent wage gain. On the other hand, the same level of increase in non-routine manual and routine cognitive task scores are associated with a wage penalty of 5.84 percent, 12.66 percent and 21.45 percent, respectively.

Following the task classification of Ingram and Neumann [2006], one can identify the returns to skills relating to intelligence, clerical, fine motor and physical tasks. The second column suggests that a one-standard deviation increase in skills associated with intelligence and clerical tasks leads to 13.92 percent and 4.53 percent wage gains, *ceteris paribus*. Physical and fine motor tasks, although insignificant, are associated with wage penalties.

The last two columns only consider three task categories. Autor and Handel [2013] consider abstract, manual and routine task types. The manual task type is the only insignificant predictor of wage levels and has a negative estimate. Holding other things constant, both abstract and routine task types, significantly increase the individual worker’s wages by 13.92 percent and 4.21 percent, respectively. Note that the estimate of 13.92 percent wage premium for abstract skills is identical to the estimate for intelligence skills.

Lastly, the task classifications of Gathmann and Schönberg [2010] are all found to be significant explanatory variables of wage variation. That is, *ceteris paribus*, a one-standard deviation increase in cognitive skills leads to a 5.7 percent wage premium. Similar increases in manual and interpersonal skills are associated with wage penalties equivalent to 10.17 percent and 1.91 percent, respectively.

For all classifications, the signs and magnitudes of the estimates of each task type seem to be intuitive and expected. That is, tasks which require higher level of thinking and complexity are rewarded more in the market. Specifically, cognitive or non-routine analytical skills are associated with large positive wage premiums. This is also consistent with the prediction of the model discussed above.

⁷ In the literature, analyzing the returns to task-specific skills usually entails multiple period analysis. That is, how much have the returns to task-specific skills changed over time. However, in this paper, we only attempt to estimate the returns to task-specific skills for one period. Further study on this subject matter is recommended.

Table 2. Coefficient Estimates of Task Scores⁸ from the Heckman Sample Selection Regression

	Autor et al. [2003]		Ingram and Neumann [2006]		Autor and Handel [2013]		Gathmann and Schönberg [2010]	
Task Types	Non-routine analytical	0.1967*** (0.0143)	Intelligence	0.1392*** (0.02)	Abstract	0.1392*** (0.0232)	Manual	-0.1017*** (0.0046)
	Non-routine interpersonal skill	-0.0018 (0.0113)	Clerical	.0453** (0.0146)	Manual	-0.0186 (0.0197)	Cognitive	0.057*** (0.0041)
	Non-routine manual	-0.0484** (0.015)	Fine Motor	-0.0215 (0.0168)	Routine	0.0421* (0.0194)	Interpersonal	-0.0191*** (0.0053)
	Routine manual	-0.013 (0.0103)	Physical	0.0027 (0.0114)				
	Routine cognitive	.0294* 0.013						
	Constant	8.748*** (0.0563)		8.691*** (0.0575)		8.675*** (0.0574)		8.632*** (0.0567)
Wald test of indep. eqns.		938.37		983.93		979.44		927.45

Note. $n=26,736$; Standard errors are in parentheses. All models include demographic variables such as educational attainment, potential work experience, sex, public/private sector and regional dummies and are weighted by sampling weights.

* $p < .05$; ** $p < .01$; *** $p < .001$

⁸ To deal with the perfect collinearity of the task scores, I added a small random number $\varepsilon \sim (0, 0.06)$ for each task score. The source of the perfect collinearity is the nature of the task profiling elaborated in the methodology.

Occupational distance measures

From the task profiles of Generalao [2019b], we can easily plug in the normalized task scores of any pair of occupations and derive distance measures following Equation 1. These distance measures are paired with the direction measure of our choice. As elaborated above, we will use the more intuitive weighted direction measure. This results to the estimation of an overall occupational distance measure.

Using these occupational distance and direction measures, we can now compare any pair of occupations in terms of their task profiles. We cannot only determine whether an occupational move from one to another is upskilling, down-skilling or a lateral move but also the relative magnitude of reskilling needed for such a move.

Suppose we compare two occupations, say, accountants and garbage recyclers and collectors, across all other occupations. Tables 3 and 4 describe the outcomes of our comparisons using our derived measures. Both tables contain the initial occupation in the first column moving to say, an accountant or a garbage collector, and are arranged from the most upskilling to the most down-skilling.

For instance, from Table 3, individuals currently employed or skilled to be in any of the first 8 occupations, namely crane, hoist and related plant operators, earthmoving and related plant operators, food and related products machine operators, hand packers, packing, bottling and labelling machine operators, paper products machine operators, shoemaking and related machine operators, textile, fur and leather products machine operators not elsewhere classified, require the most upskilling needed to become an accountant. On the other hand, looking at the bottom rows of the same table, economists, geologists and geophysicists, sociologists, anthropologists and related professionals, visual artists becoming accountants are identified to be the most, yet only slightly, down-skilling occupational moves. The down-skilling move is determined by the fourth column, *Sign of the direction*, while the small magnitude is captured by the value of the last column, which is close to zero. Majority of the occupations moving to an accounting job requires a certain level of upskilling which clearly suggests that being an accountant is a relatively high-skilled occupation.

Table 3. Distance and directions measures of occupations relative to Accountants (from the most upskilling to the most down-skilling)

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Crane, Hoist and Related Plant Operators	5.5542	0.6761	positive	5.5542	3.7553
Earthmoving and Related Plant Operators	5.5542	0.6761	positive	5.5542	3.7553

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Food and Related Products Machine Operators	5.5542	0.6761	positive	5.5542	3.7553
Hand Packers	5.5542	0.6761	positive	5.5542	3.7553
Packing, Bottling and Labelling Machine Operators	5.5542	0.6761	positive	5.5542	3.7553
Paper Products Machine Operators	5.5542	0.6761	positive	5.5542	3.7553
Shoemaking and Related Machine Operators	5.5542	0.6761	positive	5.5542	3.7553
Textile, Fur and Leather Products Machine Operators Not Elsewhere Classified	5.5542	0.6761	positive	5.5542	3.7553
Glass and Ceramics Plant Operators	5.2690	0.6831	positive	5.2690	3.5990
Fur and Leather Preparing Machine Operators	5.2192	0.6843	positive	5.2192	3.5716
Fiber Preparing, Spinning and Winding Machine Operators	4.9621	0.6911	positive	4.9621	3.4295
Wood Processing Plant Operators	4.8563	0.6941	positive	4.8563	3.3710
Bicycle and Related Repairers	4.3830	0.7662	positive	4.3830	3.3584
Building Structure Cleaners	4.3830	0.7662	positive	4.3830	3.3584
Carpenters and Joiners	4.3830	0.7662	positive	4.3830	3.3584
Cleaners and Helpers in Offices, Hotels and Other Establishments	4.3830	0.7662	positive	4.3830	3.3584
Concrete Placers, Concrete Finishers and Related Workers	4.3830	0.7662	positive	4.3830	3.3584

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Craft and Related Workers Not Elsewhere Classified	4.3830	0.7662	positive	4.3830	3.3584
Fishery and Aquaculture Labourers	4.3830	0.7662	positive	4.3830	3.3584
Fruit, Vegetable and Related Preservers	4.3830	0.7662	positive	4.3830	3.3584
Hand Launderers and Pressers	4.3830	0.7662	positive	4.3830	3.3584
Handicraft Workers in Wood, Basketry and Related Materials	4.3830	0.7662	positive	4.3830	3.3584
Metal Moulders and Coremakers	4.3830	0.7662	positive	4.3830	3.3584
Odd-job Persons	4.3830	0.7662	positive	4.3830	3.3584
Other Cleaning Workers	4.3830	0.7662	positive	4.3830	3.3584
Ships' Deck Crews and Related Workers	4.3830	0.7662	positive	4.3830	3.3584
Spray Painters and Varnishers	4.3830	0.7662	positive	4.3830	3.3584
Vehicle Cleaners	4.3830	0.7662	positive	4.3830	3.3584
Water and Firewood Collectors	4.3830	0.7662	positive	4.3830	3.3584
Creative and Performing Artists Not Elsewhere Classified	5.3399	0.6240	positive	5.3399	3.3323
Dancers and Choreographers	5.3399	0.6240	positive	5.3399	3.3323
Fashion and Other Models	5.3399	0.6240	positive	5.3399	3.3323
Weaving and Knitting Machine Operators	4.7150	0.6773	positive	4.7150	3.1935
Bricklayers and Related Workers	4.4846	0.7062	positive	4.4846	3.1668
Laundry Machine Operators	4.7304	0.6678	positive	4.7304	3.1591

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Bleaching, Dyeing and Fabric Cleaning Machine Operators	4.6521	0.6774	positive	4.6521	3.1514
Handicraft Workers in Textile, Leather and Related Materials	4.2100	0.7480	positive	4.2100	3.1492
Forestry Labourers	4.1581	0.7550	positive	4.1581	3.1393
Pelt Dressers, Tanners and Fellmongers	4.1975	0.7466	positive	4.1975	3.1340
Print Finishing and Binding Workers	4.5851	0.6816	positive	4.5851	3.1250
Sewing, Embroidery and Related Workers	4.1831	0.7450	positive	4.1831	3.1164
Bus and Tram Drivers	4.1345	0.7534	positive	4.1345	3.1148
Mining and Quarrying Labourers	4.1345	0.7534	positive	4.1345	3.1148
Building Construction Labourers	4.1066	0.7512	positive	4.1066	3.0850
Kitchen Helpers	4.1066	0.7512	positive	4.1066	3.0850
Domestic Cleaners and Helpers	4.1288	0.7459	positive	4.1288	3.0797
Civil Engineering Labourers	4.0744	0.7482	positive	4.0744	3.0485
Firefighters	4.0987	0.7425	positive	4.0987	3.0434
Subsistence Mixed Crop and Livestock Farmers	4.1227	0.7379	positive	4.1227	3.0423
Garden and Horticultural Labourers	4.0574	0.7462	positive	4.0574	3.0277
Subsistence Fishers, Hunters, Trappers and Gatherers	4.0938	0.7344	positive	4.0938	3.0064
Garbage and Recycling Collectors	4.0415	0.7437	positive	4.0415	3.0057

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Sweepers and Related Labourers	4.0415	0.7437	positive	4.0415	3.0057
Floor Layers and Tile Setters	4.1611	0.7212	positive	4.1611	3.0009
Manufacturing Labourers Not Elsewhere Classified	4.1611	0.7212	positive	4.1611	3.0009
Mobile Farm and Forestry Plant Operators	4.1611	0.7212	positive	4.1611	3.0009
Building Frame and Related Trades Workers Not Elsewhere Classified	4.0289	0.7362	positive	4.0289	2.9661
Information and Communications Technology Installers and Servicers	4.0578	0.7298	positive	4.0578	2.9615
Stonemasons, Stone cutters, Splitters and Carvers	4.0578	0.7298	positive	4.0578	2.9615
Subsistence Crop Farmers	4.0578	0.7298	positive	4.0578	2.9615
Crop Farm Labourers	4.0425	0.7324	positive	4.0425	2.9609
Metal Finishing, Plating and Coating Machine Operators	4.6424	0.6349	positive	4.6424	2.9476
Conference and Event Planners	4.8272	0.6079	positive	4.8272	2.9346
House Builders	4.0059	0.7256	positive	4.0059	2.9067
Riggers and Cable Splicers	4.0121	0.7238	positive	4.0121	2.9038
Structural Metal Preparers and Erectors	4.0121	0.7238	positive	4.0121	2.9038
Rubber Products Machine Operators	4.3742	0.6637	positive	4.3742	2.9031
Sewing Machine Operators	4.2781	0.6781	positive	4.2781	2.9008

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Drivers of Animal-drawn Vehicles and Machinery	3.9344	0.7279	positive	3.9344	2.8639
Fast Food Preparers	3.9344	0.7279	positive	3.9344	2.8639
Waiters	4.0264	0.7053	positive	4.0264	2.8398
Miners and Quarriers	4.1267	0.6879	positive	4.1267	2.8385
Hunters and Trappers	3.9526	0.7153	positive	3.9526	2.8272
Motorcycle Drivers	3.9526	0.7153	positive	3.9526	2.8272
Tobacco Preparers and Tobacco Products Makers	3.9526	0.7153	positive	3.9526	2.8272
Butchers, Fishmongers and Related Food Preparers	3.8909	0.7231	positive	3.8909	2.8135
Hairdressers	3.8862	0.7166	positive	3.8862	2.7848
Street and Related Services Workers	3.8862	0.7166	positive	3.8862	2.7848
Mixed Crop and Livestock Farm Labourers	3.8585	0.7185	positive	3.8585	2.7723
Wood Treaters	4.0080	0.6893	positive	4.0080	2.7628
Fumigators and Other Pest and Weed Controllers	3.8395	0.7170	positive	3.8395	2.7528
Livestock Farm Labourers	3.8446	0.7137	positive	3.8446	2.7440
Motor Vehicle Mechanics and Repairers	3.8737	0.7025	positive	3.8737	2.7213
Car, Taxi and Van Drivers	3.8057	0.7119	positive	3.8057	2.7091
Welders and Flame Cutters	3.8057	0.7119	positive	3.8057	2.7091
Domestic Housekeepers	3.8221	0.7063	positive	3.8221	2.6996
Freight Handlers	3.9753	0.6787	positive	3.9753	2.6980
Security Guards	3.9753	0.6787	positive	3.9753	2.6980

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Plastic Products Machine Operators	3.8824	0.6912	positive	3.8824	2.6835
Tailors, Dressmakers, Furriers and Hatters	3.8421	0.6967	positive	3.8421	2.6769
Electrical Mechanics and Fitters	3.8253	0.6934	positive	3.8253	2.6525
Plasterers	3.8253	0.6934	positive	3.8253	2.6525
Home-based Personal Care Workers	3.8779	0.6747	positive	3.8779	2.6165
Insulation Workers	3.7665	0.6937	positive	3.7665	2.6129
Building Caretakers	3.8031	0.6810	positive	3.8031	2.5901
Cleaning and Housekeeping Supervisors in Offices, Hotels and Other Establishments	3.8031	0.6810	positive	3.8031	2.5901
Mineral and Stone Processing Plant Operators	4.2441	0.6102	positive	4.2441	2.5898
Railway Brake, Signal and Switch Operators	4.2441	0.6102	positive	4.2441	2.5898
Locomotive Engine Drivers	3.7124	0.6972	positive	3.7124	2.5884
Subsistence Livestock Farmer	3.7420	0.6907	positive	3.7420	2.5844
Religious Professionals	4.7233	0.5466	positive	4.7233	2.5816
Garment and Related Patternmakers and Cutters	3.7715	0.6813	positive	3.7715	2.5694
Prison Guards	4.0263	0.6357	positive	4.0263	2.5595
Teachers' Aides	4.0263	0.6357	positive	4.0263	2.5595
Food Service Counter Attendants	3.7464	0.6828	positive	3.7464	2.5581
Dairy Products Makers	3.6994	0.6913	positive	3.6994	2.5572

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Service Station Attendants	3.6994	0.6913	positive	3.6994	2.5572
Bartenders	3.6630	0.6943	positive	3.6630	2.5432
Undertakers and Embalmers	3.7319	0.6764	positive	3.7319	2.5241
Musical Instrument Makers and Tuners	3.7439	0.6736	positive	3.7439	2.5217
Construction Supervisors	4.2848	0.5865	positive	4.2848	2.5129
Personal Services Workers Not Elsewhere Classified	4.2848	0.5865	positive	4.2848	2.5129
Power Production Plant Operators	3.9411	0.6362	positive	3.9411	2.5074
Information and Communications Technology Operations Technicians	4.0117	0.6219	positive	4.0117	2.4949
Deep-sea Fishery Workers	3.6635	0.6780	positive	3.6635	2.4838
Pet Groomers and Animal Care Workers	3.6635	0.6780	positive	3.6635	2.4838
Well Drillers and Borehole and Related Workers	3.7318	0.6650	positive	3.7318	2.4816
Potters and Related Workers	3.6283	0.6824	positive	3.6283	2.4759
Painters and Related Workers	3.7179	0.6643	positive	3.7179	2.4697
Street Food Salespersons	3.7179	0.6643	positive	3.7179	2.4697
Cooks	3.5974	0.6850	positive	3.5974	2.4643
Photographic Products Machine Operators	4.3427	0.5619	positive	4.3427	2.4401
Contact Centre Salespersons	4.1934	0.5818	positive	4.1934	2.4396
Field Crop and Vegetable Growers	3.6683	0.6641	positive	3.6683	2.4361

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Mixed Crop Growers	3.6683	0.6641	positive	3.6683	2.4361
Tree and Shrub Crop Growers	3.6683	0.6641	positive	3.6683	2.4361
Blacksmiths, Hammersmiths and Forging Press Workers	3.6372	0.6677	positive	3.6372	2.4284
Debt Collectors and Related Workers	4.1439	0.5790	positive	4.1439	2.3991
Traditional Chiefs and Heads of Villages	4.5473	0.5244	positive	4.5473	2.3848
Metal Working Machine Tool Setters and Operators	3.6581	0.6512	positive	3.6581	2.3823
Woodworking Machine Tool Setters and Operators	3.6581	0.6512	positive	3.6581	2.3823
Personal Care Workers in Health Services Not Elsewhere Classified	3.5890	0.6576	positive	3.5890	2.3600
Heavy Truck and Lorry Drivers	3.6867	0.6388	positive	3.6867	2.3551
Mail Carriers and Sorting Clerks	3.6867	0.6388	positive	3.6867	2.3551
Precision-instrument Makers and Repairers	3.6867	0.6388	positive	3.6867	2.3551
Bakers, Pastry-cooks and Confectionery Makers	3.5908	0.6529	positive	3.5908	2.3444
Aquaculture Workers	3.6989	0.6329	positive	3.6989	2.3410
Hand and Pedal Vehicle Drivers	3.5707	0.6463	positive	3.5707	2.3076

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Agricultural and Industrial Machinery Mechanics and Repairers	3.5738	0.6441	positive	3.5738	2.3019
Companions and Valets	3.6225	0.6339	positive	3.6225	2.2962
Jewellery and Precious metal Workers	3.5600	0.6436	positive	3.5600	2.2912
Travel Attendants and Travel Stewards	3.6525	0.6218	positive	3.6525	2.2713
Health Care Assistants	3.6102	0.6264	positive	3.6102	2.2613
Roofers	3.6102	0.6264	positive	3.6102	2.2613
Glass Makers, Cutters, Grinders and Finishers	3.6225	0.6221	positive	3.6225	2.2534
Travel Guides	3.8149	0.5897	positive	3.8149	2.2498
Refuse Sorters	3.7684	0.5963	positive	3.7684	2.2471
Metal Processing Plant Operators	3.9188	0.5731	positive	3.9188	2.2460
Office Supervisors	4.4153	0.5078	positive	4.4153	2.2423
Bank Tellers and Related Clerks	4.3748	0.5113	positive	4.3748	2.2370
Clearing and Forwarding Agents	4.3748	0.5113	positive	4.3748	2.2370
Clerical Support Workers Not Elsewhere Classified	4.3748	0.5113	positive	4.3748	2.2370
Coding, Proof-reading and Related clerks	4.3748	0.5113	positive	4.3748	2.2370
Data Entry Clerks	4.3748	0.5113	positive	4.3748	2.2370
Filing and Copying Clerks	4.3748	0.5113	positive	4.3748	2.2370
Food and Beverage Tasters and Graders	4.3748	0.5113	positive	4.3748	2.2370
General Office Clerks	4.3748	0.5113	positive	4.3748	2.2370
Hotel Receptionists	4.3748	0.5113	positive	4.3748	2.2370
Inquiry Clerks	4.3748	0.5113	positive	4.3748	2.2370

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Payroll Clerks	4.3748	0.5113	positive	4.3748	2.2370
Personnel Clerks	4.3748	0.5113	positive	4.3748	2.2370
Production Clerks	4.3748	0.5113	positive	4.3748	2.2370
Receptionists (general)	4.3748	0.5113	positive	4.3748	2.2370
Secretaries (general)	4.3748	0.5113	positive	4.3748	2.2370
Stock Clerks	4.3748	0.5113	positive	4.3748	2.2370
Transport Clerks	4.3748	0.5113	positive	4.3748	2.2370
Typists and Word Processing Operators	4.3748	0.5113	positive	4.3748	2.2370
Poultry Producers	3.4886	0.6395	positive	3.4886	2.2310
Pharmaceutical Technicians and Assistants	4.1160	0.5397	positive	4.1160	2.2213
Elementary Workers Not Elsewhere Classified	4.0873	0.5432	positive	4.0873	2.2202
Assemblers Not Elsewhere Classified	3.9472	0.5623	positive	3.9472	2.2196
Mechanical Machinery Assemblers	3.9472	0.5623	positive	3.9472	2.2196
Meter Readers and Vending-machine Collectors	4.0515	0.5478	positive	4.0515	2.2193
Metal Production Process Controllers	3.8054	0.5832	positive	3.8054	2.2192
Messengers, Package Deliverers and Luggage Porters	4.0062	0.5538	positive	4.0062	2.2187
Livestock and Dairy Producers	3.4523	0.6406	positive	3.4523	2.2115
Beauticians and Related Workers	3.5090	0.6295	positive	3.5090	2.2088
Transport Conductors	3.6232	0.6088	positive	3.6232	2.2058
Metal Polishers, Wheel Grinders and Tool Sharpeners	3.6268	0.6077	positive	3.6268	2.2041

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Aircraft Engine Mechanics and Repairers	3.4865	0.6313	positive	3.4865	2.2011
Nursing Associate professionals	3.5753	0.6151	positive	3.5753	2.1991
Inland and Coastal Waters Fishery Workers	3.4213	0.6418	positive	3.4213	2.1959
Electrical and Electronic Equipment Assemblers	3.6749	0.5953	positive	3.6749	2.1876
Lifting Truck Operators	3.6749	0.5953	positive	3.6749	2.1876
Cashiers and Ticket Clerks	4.1094	0.5319	positive	4.1094	2.1860
Printers	3.7816	0.5763	positive	3.7816	2.1793
Ambulance Workers	3.6821	0.5914	positive	3.6821	2.1776
Sales Demonstrators	3.9111	0.5564	positive	3.9111	2.1762
Chemical Products Plant and Machine Operators	3.7403	0.5813	positive	3.7403	2.1742
Shelf Fillers	3.8538	0.5638	positive	3.8538	2.1728
Health Associate Professionals Not Elsewhere Classified	3.9039	0.5536	positive	3.9039	2.1612
Information and Communications Technology Services Managers	4.3314	0.4973	positive	4.3314	2.1539
Information and Communications Technology Sales Professionals	4.0749	0.5274	positive	4.0749	2.1493
Legal Secretaries	4.0749	0.5274	positive	4.0749	2.1493
Door-to-door Salespersons	3.6981	0.5800	positive	3.6981	2.1447
Client Information Workers Not Elsewhere Classified	3.9031	0.5489	positive	3.9031	2.1424

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Ships' Engineers	3.6622	0.5849	positive	3.6622	2.1419
Street Vendors (excluding Food)	3.6622	0.5849	positive	3.6622	2.1419
Business Services Agents Not Elsewhere Classified	4.0383	0.5301	positive	4.0383	2.1408
Library Clerks	4.0383	0.5301	positive	4.0383	2.1408
Medical Records and Health Information Technicians	4.0383	0.5301	positive	4.0383	2.1408
Medical Assistants	3.9941	0.5339	positive	3.9941	2.1323
Administrative and Executive Secretaries	3.9435	0.5395	positive	3.9435	2.1276
Cement, Stone and Other Mineral Products Machine Operators	3.6253	0.5863	positive	3.6253	2.1254
Shop Sales Assistants	3.7252	0.5668	positive	3.7252	2.1116
Mixed Crop and Animal Producers	3.3894	0.6142	positive	3.3894	2.0816
Protective Services Workers Not Elsewhere Classified	3.4560	0.5984	positive	3.4560	2.0680
Community Health Workers	4.2307	0.4846	positive	4.2307	2.0503
Cabinet-makers and Related Workers	3.3498	0.6113	positive	3.3498	2.0479
Animal Producers Not Elsewhere Classified	3.3268	0.6131	positive	3.3268	2.0395
Gardeners, Horticultural and Nursery Growers	3.3401	0.6027	positive	3.3401	2.0129
Upholsterers and Related Workers	3.3401	0.6027	positive	3.3401	2.0129
Underwater Divers	3.2897	0.6089	positive	3.2897	2.0030

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Shoemakers and Related Workers	3.3170	0.5979	positive	3.3170	1.9833
Early Childhood Educators	4.1077	0.4691	positive	4.1077	1.9270
Policy and Planning Managers	4.1077	0.4691	positive	4.1077	1.9270
Pulp and Papermaking Plant Operators	3.5656	0.5348	positive	3.5656	1.9067
Electrical Line Installers and Repairers	3.2333	0.5839	positive	3.2333	1.8878
Fitness and Recreation Instructors and Programme Leaders	3.8196	0.4891	positive	3.8196	1.8680
Religious Associate Professionals	3.8196	0.4891	positive	3.8196	1.8680
Chemical Processing Plant Controllers	3.4296	0.5388	positive	3.4296	1.8479
Restaurant Managers	3.6146	0.5092	positive	3.6146	1.8407
Veterinary Technicians and Assistants	3.2112	0.5729	positive	3.2112	1.8397
Petroleum and Natural Gas Refining Plant Operators	3.6491	0.4933	positive	3.6491	1.8002
Glaziers	3.2251	0.5564	positive	3.2251	1.7945
Police Officers	3.2251	0.5564	positive	3.2251	1.7945
Actors	3.6175	0.4922	positive	3.6175	1.7807
Advertising and Public Relations Managers	3.9541	0.4498	positive	3.9541	1.7784
Finance Managers	3.9541	0.4498	positive	3.9541	1.7784
Research and Development Managers	3.9541	0.4498	positive	3.9541	1.7784

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Sales and Marketing Managers	3.9541	0.4498	positive	3.9541	1.7784
Child Care Workers	3.5257	0.4946	positive	3.5257	1.7439
Dentists	3.4669	0.5027	positive	3.4669	1.7427
Incinerator and Water Treatment Plant Operators	3.4181	0.5001	positive	3.4181	1.7093
Gallery, Museum and Library Technicians	3.1602	0.5397	positive	3.1602	1.7055
Forestry and Related Workers	3.0540	0.5429	positive	3.0540	1.6580
Plumbers and Pipe Fitters	3.0209	0.5474	positive	3.0209	1.6537
Buyers	3.5321	0.4621	positive	3.5321	1.6321
Primary School Teachers	3.5321	0.4621	positive	3.5321	1.6321
Broadcasting and Audiovisual Technicians	3.4055	0.4749	positive	3.4055	1.6174
Information and Communications Technology User Support Technicians	3.1839	0.5056	positive	3.1839	1.6097
Film, Stage and Related Directors and Producers	3.7568	0.4249	positive	3.7568	1.5961
Real Estate Agents and Property Managers	3.3508	0.4761	positive	3.3508	1.5955
Steam Engine and Boiler Operators	3.1120	0.5114	positive	3.1120	1.5913
Employment Agents and Contractors	3.3825	0.4703	positive	3.3825	1.5907
Ships' Deck Officers and Pilots	3.1666	0.4983	positive	3.1666	1.5780
Pre-press Technicians	3.6606	0.4279	positive	3.6606	1.5662
Travel Consultants and Clerks	3.6606	0.4279	positive	3.6606	1.5662
Shop Supervisors	3.3569	0.4665	positive	3.3569	1.5659

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Customs and Border Inspectors	3.0778	0.5048	positive	3.0778	1.5538
Commercial Sales Representatives	3.3741	0.4440	positive	3.3741	1.4980
Stall and Market Salespersons	2.9614	0.5039	positive	2.9614	1.4923
Hotel Managers	3.2730	0.4508	positive	3.2730	1.4755
Computer Network and Systems Technicians	3.5415	0.4139	positive	3.5415	1.4660
Contact Centre Information Clerks	3.5415	0.4139	positive	3.5415	1.4660
Electronics Mechanics and Servicers	2.7620	0.5256	positive	2.7620	1.4517
Trade Brokers	3.1703	0.4515	positive	3.1703	1.4314
Shotfirers and Blasters	2.8586	0.4896	positive	2.8586	1.3995
Credit and Loans Officers	3.2277	0.4327	positive	3.2277	1.3967
Driving Instructors	3.4940	0.3917	positive	3.4940	1.3685
Manufacturing Supervisors	3.4940	0.3917	positive	3.4940	1.3685
Professional Services Managers Not Elsewhere Classified	3.4940	0.3917	positive	3.4940	1.3685
Medical and Dental Prosthetic Technicians	2.7578	0.4935	positive	2.7578	1.3609
Announcers on Radio, Television and Other Media	3.0956	0.4395	positive	3.0956	1.3606
Survey and Market Research Interviewers	3.0956	0.4395	positive	3.0956	1.3606
Air Conditioning and Refrigeration Mechanics	2.7199	0.4927	positive	2.7199	1.3401
Building and Related Electricians	2.7199	0.4927	positive	2.7199	1.3401

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Aquaculture and Fisheries Production Managers	3.3383	0.4009	positive	3.3383	1.3382
Athletes and Sports Players	2.8385	0.4712	positive	2.8385	1.3376
Sheet Metal Workers	2.7214	0.4900	positive	2.7214	1.3336
Accounting and Bookkeeping Clerks	3.3749	0.3945	positive	3.3749	1.3313
Government Licensing Officials	3.3749	0.3945	positive	3.3749	1.3313
Pawnbrokers and Money-lenders	3.3749	0.3945	positive	3.3749	1.3313
Health Services Managers	3.2980	0.4036	positive	3.2980	1.3312
Construction Managers	3.1816	0.4134	positive	3.1816	1.3154
Telephone Switchboard Operators	3.0519	0.4274	positive	3.0519	1.3044
Chefs	2.9820	0.4179	positive	2.9820	1.2461
Education Managers	3.3271	0.3705	positive	3.3271	1.2328
Human Resource Managers	3.3271	0.3705	positive	3.3271	1.2328
Teaching Professionals Not Elsewhere Classified	3.3271	0.3705	positive	3.3271	1.2328
Dental Assistants and Therapists	2.6500	0.4515	positive	2.6500	1.1965
Paramedical Practitioners	3.0328	0.3940	positive	3.0328	1.1949
Product Graders and Testers (excluding Foods and Beverages)	3.0328	0.3940	positive	3.0328	1.1949
Air Traffic Controllers	2.6034	0.4571	positive	2.6034	1.1901
Special Needs Teachers	2.9393	0.4032	positive	2.9393	1.1851
Legislators	3.2645	0.3626	positive	3.2645	1.1838

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Forestry Technicians	2.9766	0.3924	positive	2.9766	1.1679
University and Higher Education Teachers	3.0730	0.3791	positive	3.0730	1.1651
Midwifery Associate professionals	2.6806	0.4290	positive	2.6806	1.1499
Toolmakers and Related Workers	2.4855	0.4596	positive	2.4855	1.1424
Traditional and Complementary Medicine Professionals	2.8402	0.3927	positive	2.8402	1.1152
Medical Imaging and Therapeutic Equipment Technicians	2.7870	0.3934	positive	2.7870	1.0964
Medical Secretaries	2.7870	0.3934	positive	2.7870	1.0964
Midwifery Professionals	2.8761	0.3793	positive	2.8761	1.0910
Other Arts Teachers	3.1271	0.3452	positive	3.1271	1.0795
Insurance Representatives	2.8902	0.3729	positive	2.8902	1.0777
Photographers	2.4388	0.4290	positive	2.4388	1.0462
Signwriters, Decorative Painters, Engravers and Etchers	2.3874	0.4301	positive	2.3874	1.0268
Supply, Distribution and Related Managers	3.0356	0.3336	positive	3.0356	1.0126
Aircraft Pilots and Related Associate Professionals	2.4629	0.4043	positive	2.4629	0.9958
Audiologists and Speech Therapists	2.6420	0.3766	positive	2.6420	0.9949
Web Technicians	2.6420	0.3766	positive	2.6420	0.9949
Chemical and Physical Science Technicians	2.2984	0.4290	positive	2.2984	0.9860

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Traditional and Complementary Medicine Associate Professionals	2.4481	0.3966	positive	2.4481	0.9709
Environmental and Occupational Health Inspectors and Associates	2.5930	0.3698	positive	2.5930	0.9590
Nursing Professionals	2.4237	0.3841	positive	2.4237	0.9308
Life Science Technicians (excluding Medical)	2.6714	0.3442	positive	2.6714	0.9195
Aged Care Services Managers	2.7399	0.3339	positive	2.7399	0.9149
Vocational Education Teachers	2.7399	0.3339	positive	2.7399	0.9149
Agricultural and Forestry Production Managers	2.7075	0.3242	positive	2.7075	0.8777
Secondary Education Teachers	2.4150	0.3630	positive	2.4150	0.8766
Financial and Insurance Services Branch Managers	2.8279	0.3072	positive	2.8279	0.8687
Veterinarians	2.7082	0.3165	positive	2.7082	0.8573
Physiotherapy Technicians and Assistants	2.2242	0.3778	positive	2.2242	0.8403
Sports, Recreation and Cultural Centre Managers	2.4155	0.3416	positive	2.4155	0.8251
Specialist Medical Practitioners	2.5310	0.3259	positive	2.5310	0.8249
Securities and Finance Dealers and Brokers	2.4225	0.3227	positive	2.4225	0.7816
Dieticians and Nutritionists	2.4342	0.3092	positive	2.4342	0.7526
Other Music Teachers	2.4685	0.2969	positive	2.4685	0.7330

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Social Work and Counselling Professionals	2.4685	0.2969	positive	2.4685	0.7330
Database and Network Professionals Not Elsewhere Classified	2.2465	0.3204	positive	2.2465	0.7197
Business Services and Administration Managers Not Elsewhere Classified	2.5796	0.2755	positive	2.5796	0.7106
Lawyers	2.5796	0.2755	positive	2.5796	0.7106
Musicians, Singers and Composers	2.5796	0.2755	positive	2.5796	0.7106
Social Welfare Managers	2.5796	0.2755	positive	2.5796	0.7106
Social Work Associate Professionals	2.5796	0.2755	positive	2.5796	0.7106
Bookmakers, Croupiers and Related Gaming Workers	2.0290	0.3286	positive	2.0290	0.6666
Statistical, Finance and Insurance Clerks	2.3749	0.2776	positive	2.3749	0.6592
Systems Administrators	2.3749	0.2776	positive	2.3749	0.6592
Police Inspectors and Detectives	2.0722	0.2992	positive	2.0722	0.6200
Technical and Medical Sales Professionals (excluding ICT)	2.0769	0.2960	positive	2.0769	0.6148
Child Care Services Managers	2.1209	0.2892	positive	2.1209	0.6133
Physiotherapists	2.0784	0.2931	positive	2.0784	0.6091
Retail and Wholesale Trade Managers	2.0784	0.2931	positive	2.0784	0.6091
Managing Directors and Chief Executives	2.3325	0.2438	positive	2.3325	0.5687

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Optometrists and Ophthalmic Opticians	2.0013	0.2770	positive	2.0013	0.5543
Shopkeepers	2.0013	0.2770	positive	2.0013	0.5543
Public Relations Professionals	2.0944	0.2614	positive	2.0944	0.5475
Sports Coaches, Instructors and Officials	1.9634	0.2764	positive	1.9634	0.5428
Senior Government Officials	2.2777	0.2368	positive	2.2777	0.5393
Senior Officials of Special-interest Organizations	2.2777	0.2368	positive	2.2777	0.5393
Air Traffic Safety Electronics Technicians	1.9397	0.2767	positive	1.9397	0.5366
Building Architects	1.9397	0.2767	positive	1.9397	0.5366
Landscape Architects	1.9397	0.2767	positive	1.9397	0.5366
Pharmacists	1.8791	0.2676	positive	1.8791	0.5029
Agricultural Technicians	1.6593	0.2842	positive	1.6593	0.4715
Manufacturing Managers	2.1277	0.2174	positive	2.1277	0.4626
Dispensing Opticians	1.7628	0.2473	positive	1.7628	0.4360
Mining Managers	2.0381	0.2058	positive	2.0381	0.4194
Mining Supervisors	2.0381	0.2058	positive	2.0381	0.4194
Government Regulatory Associate Professionals Not Elsewhere Classified	1.8749	0.2191	positive	1.8749	0.4109
Government Social Benefits Officials	1.8749	0.2191	positive	1.8749	0.4109
Accounting Associate Professionals	1.6746	0.2379	positive	1.6746	0.3984

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Financial and Investment Advisers	1.6746	0.2379	positive	1.6746	0.3984
Training and Staff Development Professionals	1.9042	0.1884	positive	1.9042	0.3587
Environmental Engineers	1.5190	0.2117	positive	1.5190	0.3216
Management and Organization Analysts	1.5190	0.2117	positive	1.5190	0.3216
Education Methods Specialists	1.6245	0.1945	positive	1.6245	0.3160
Generalist Medical Practitioners	1.4880	0.2028	positive	1.4880	0.3018
Civil Engineering Technicians	1.3870	0.2150	positive	1.3870	0.2982
Information Technology Trainers	1.6833	0.1593	positive	1.6833	0.2682
Physical and Engineering Science Technicians Not Elsewhere Classified	1.3602	0.1937	positive	1.3602	0.2634
Industrial and Production Engineers	1.3254	0.1832	positive	1.3254	0.2429
Chemical Engineering Technicians	1.3749	0.1607	positive	1.3749	0.2210
Software and Applications Developers and Analysts Not Elsewhere Classified	1.3749	0.1607	positive	1.3749	0.2210
Valuers and Loss Assessors	1.3749	0.1607	positive	1.3749	0.2210
Archivists and Curators	1.2277	0.1720	positive	1.2277	0.2111
Mechanical Engineering Technicians	1.0566	0.1780	positive	1.0566	0.1880
Draughtspersons	1.2500	0.1461	positive	1.2500	0.1826

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Mining and Metallurgical Technicians	1.2500	0.1461	positive	1.2500	0.1826
Judges	1.4353	0.1261	positive	1.4353	0.1810
Systems Analysts	1.4353	0.1261	positive	1.4353	0.1810
Health Professionals Not Elsewhere Classified	1.1233	0.1602	positive	1.1233	0.1799
Other Language Teachers	1.1233	0.1602	positive	1.1233	0.1799
Environmental and Occupational Health and Hygiene Professionals	1.0680	0.1248	positive	1.0680	0.1333
Farming, Forestry and Fisheries Advisers	1.2541	0.1012	positive	1.2541	0.1269
Software Developers	1.2541	0.1012	positive	1.2541	0.1269
Librarians and Related Information Professionals	1.0416	0.1217	positive	1.0416	0.1268
Scribes and Related Workers	1.0416	0.1217	positive	1.0416	0.1268
Translators, Interpreters and Other Linguists	1.0416	0.1217	positive	1.0416	0.1268
Medical and Pathology Laboratory Technicians	0.8322	0.1442	positive	0.8322	0.1200
Environmental Protection Professionals	0.8410	0.1100	positive	0.8410	0.0925
Mining Engineers, Metallurgists and Related Professionals	1.1175	0.0819	positive	1.1175	0.0915
Psychologists	1.1175	0.0819	positive	1.1175	0.0915
Computer Network Professionals	0.8035	0.0939	positive	0.8035	0.0755

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Electronics Engineering Technicians	0.8035	0.0939	positive	0.8035	0.0755
Interior Designers and Decorators	1.0121	0.0664	positive	1.0121	0.0672
Journalists	1.0121	0.0664	positive	1.0121	0.0672
Telecommunications Engineering Technicians	1.0121	0.0664	positive	1.0121	0.0672
Web and Multimedia Developers	1.0121	0.0664	positive	1.0121	0.0672
Physicists and Astronomers	0.7386	0.0863	positive	0.7386	0.0638
Cartographers and Surveyors	0.6981	0.0871	positive	0.6981	0.0608
Electrical Engineering Technicians	0.6979	0.0668	positive	0.6979	0.0466
Government Tax and Excise Officials	0.6250	0.0730	positive	0.6250	0.0457
Legal Professionals Not Elsewhere Classified	0.6250	0.0730	positive	0.6250	0.0457
Astrologers, Fortune-tellers and Related Workers	0.8634	0.0431	positive	0.8634	0.0372
Electrical Engineers	0.8634	0.0431	positive	0.8634	0.0372
Telecommunications Engineers	0.6315	0.0469	positive	0.6315	0.0296
Civil Engineers	0.7673	0.0265	positive	0.7673	0.0204
Policy Administration Professionals	0.7673	0.0265	positive	0.7673	0.0204
Electronics Engineers	0.5907	0.0319	positive	0.5907	0.0188
Applications Programmers	0.3750	0.0438	positive	0.3750	0.0164
Personnel and Careers Professionals	0.3750	0.0438	positive	0.3750	0.0164

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Philosophers, Historians and Political Scientists	0.7031	0.0141	positive	0.7031	0.0099
Statistical, Mathematical and Related Associate Professionals	0.7031	0.0141	positive	0.7031	0.0099
Town and Traffic Planners	0.7031	0.0141	positive	0.7031	0.0099
Authors and Related Writers	0.2083	0.0243	positive	0.2083	0.0051
Database Designers and Administrators	0.2083	0.0243	positive	0.2083	0.0051
Advertising and Marketing Professionals	0.6593	0.0044	positive	0.6593	0.0029
Chemists	0.6593	0.0044	positive	0.6593	0.0029
Engineering Professionals Not Elsewhere Classified	0.6593	0.0044	positive	0.6593	0.0029
Product and Garment Designers	0.6593	0.0044	positive	0.6593	0.0029
Mechanical Engineers	0.0893	0.0104	positive	0.0893	0.0009
Biologists, Botanists, Zoologists and Related Professionals	0.0000	0.0000	zero	0.0000	0.0000
Chemical Engineers	0.0000	0.0000	zero	0.0000	0.0000
Financial Analysts	0.0694	-0.0081	negative	-0.0694	-0.0006
Meteorologists	0.0694	-0.0081	negative	-0.0694	-0.0006
Graphic and Multimedia Designers	0.6290	-0.0033	negative	-0.6290	-0.0021
Mathematicians, Actuaries and Statisticians	0.6290	-0.0033	negative	-0.6290	-0.0021
Economists	0.6250	-0.0730	negative	-0.6250	-0.0457
Geologists and Geophysicists	0.6250	-0.0730	negative	-0.6250	-0.0457

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Sociologists, Anthropologists and Related Professionals	0.6250	-0.0730	negative	-0.6250	-0.0457
Visual Artists	0.6250	-0.0730	negative	-0.6250	-0.0457

The opposite pattern can be observed for garbage and recycling collectors from Table 4. Except for some predominantly non-routine manual jobs, most occupational moves to a garbage collector is generally a down-skilling implied by the *Sign of the direction* in the fourth column. This strongly suggests the relatively low-skilled nature of non-routine manual jobs, specifically of garbage and recycling collectors.

Table 4. Distance and directions measures of occupations relative to garbage and recycling collectors (from the most upskilling to the most down-skilling)

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Bicycle and Related Repairers	1.3888	0.0225	positive	1.3888	0.0313
Building Structure Cleaners	1.3888	0.0225	positive	1.3888	0.0313
Carpenters and Joiners	1.3888	0.0225	positive	1.3888	0.0313
Cleaners and Helpers in Offices, Hotels and Other Establishments	1.3888	0.0225	positive	1.3888	0.0313
Concrete Placers, Concrete Finishers and Related Workers	1.3888	0.0225	positive	1.3888	0.0313
Craft and Related Workers Not Elsewhere Classified	1.3888	0.0225	positive	1.3888	0.0313
Fishery and Aquaculture Labourers	1.3888	0.0225	positive	1.3888	0.0313
Fruit, Vegetable and Related Preservers	1.3888	0.0225	positive	1.3888	0.0313

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Hand Launderers and Pressers	1.3888	0.0225	positive	1.3888	0.0313
Handicraft Workers in Wood, Basketry and Related Materials	1.3888	0.0225	positive	1.3888	0.0313
Metal Moulders and Coremakers	1.3888	0.0225	positive	1.3888	0.0313
Odd-job Persons	1.3888	0.0225	positive	1.3888	0.0313
Other Cleaning Workers	1.3888	0.0225	positive	1.3888	0.0313
Ships' Deck Crews and Related Workers	1.3888	0.0225	positive	1.3888	0.0313
Spray Painters and Varnishers	1.3888	0.0225	positive	1.3888	0.0313
Vehicle Cleaners	1.3888	0.0225	positive	1.3888	0.0313
Water and Firewood Collectors	1.3888	0.0225	positive	1.3888	0.0313
Forestry Labourers	0.6944	0.0113	positive	0.6944	0.0078
Bus and Tram Drivers	0.5952	0.0097	positive	0.5952	0.0057
Mining and Quarrying Labourers	0.5952	0.0097	positive	0.5952	0.0057
Handicraft Workers in Textile, Leather and Related Materials	1.3036	0.0043	positive	1.3036	0.0056
Pelt Dressers, Tanners and Fellmongers	1.3005	0.0029	positive	1.3005	0.0038
Building Construction Labourers	0.4629	0.0075	positive	0.4629	0.0035
Kitchen Helpers	0.4629	0.0075	positive	0.4629	0.0035
Domestic Cleaners and Helpers	1.3507	0.0022	positive	1.3507	0.0030
Sewing, Embroidery and Related Workers	1.2975	0.0013	positive	1.2975	0.0017

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Civil Engineering Labourers	0.2778	0.0045	positive	0.2778	0.0013
Garden and Horticultural Labourers	0.1543	0.0025	positive	0.1543	0.0004
Sweepers and Related Labourers	0.0000	0.0000	zero	0.0000	0.0000
Firefighters	1.3857	-0.0012	negative	-1.3857	-0.0016
Building Frame and Related Trades Workers Not Elsewhere Classified	0.4629	-0.0075	negative	-0.4629	-0.0035
Subsistence Mixed Crop and Livestock Farmers	1.2925	-0.0058	negative	-1.2925	-0.0075
Crop Farm Labourers	0.6944	-0.0113	negative	-0.6944	-0.0078
Drivers of Animal-drawn Vehicles and Machinery	0.7579	-0.0158	negative	-0.7579	-0.0120
Fast Food Preparers	0.7579	-0.0158	negative	-0.7579	-0.0120
Subsistence Fishers, Hunters, Trappers and Gatherers	1.2950	-0.0093	negative	-1.2950	-0.0121
Mixed Crop and Livestock Farm Labourers	0.4901	-0.0252	negative	-0.4901	-0.0124
Butchers, Fishmongers and Related Food Preparers	0.7285	-0.0206	negative	-0.7285	-0.0150
Information and Communications Technology Installers and Servicers	1.3031	-0.0139	negative	-1.3031	-0.0181
Stonemasons, Stone cutters, Splitters and Carvers	1.3031	-0.0139	negative	-1.3031	-0.0181
Subsistence Crop Farmers	1.3031	-0.0139	negative	-1.3031	-0.0181

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Car, Taxi and Van Drivers	0.5907	-0.0319	negative	-0.5907	-0.0188
Welders and Flame Cutters	0.5907	-0.0319	negative	-0.5907	-0.0188
Livestock Farm Labourers	0.6297	-0.0300	negative	-0.6297	-0.0189
Fumigators and Other Pest and Weed Controllers	0.7182	-0.0268	negative	-0.7182	-0.0192
Riggers and Cable Splicers	1.3222	-0.0200	negative	-1.3222	-0.0264
Structural Metal Preparers and Erectors	1.3222	-0.0200	negative	-1.3222	-0.0264
House Builders	1.6984	-0.0181	negative	-1.6984	-0.0307
Floor Layers and Tile Setters	1.3888	-0.0225	negative	-1.3888	-0.0313
Manufacturing Labourers Not Elsewhere Classified	1.3888	-0.0225	negative	-1.3888	-0.0313
Mobile Farm and Forestry Plant Operators	1.3888	-0.0225	negative	-1.3888	-0.0313
Hairdressers	1.3500	-0.0271	negative	-1.3500	-0.0366
Street and Related Services Workers	1.3500	-0.0271	negative	-1.3500	-0.0366
Hunters and Trappers	1.3642	-0.0285	negative	-1.3642	-0.0388
Motorcycle Drivers	1.3642	-0.0285	negative	-1.3642	-0.0388
Tobacco Preparers and Tobacco Products Makers	1.3642	-0.0285	negative	-1.3642	-0.0388
Locomotive Engine Drivers	0.8821	-0.0465	negative	-0.8821	-0.0410
Insulation Workers	1.0496	-0.0500	negative	-1.0496	-0.0525
Domestic Housekeepers	1.5767	-0.0374	negative	-1.5767	-0.0590
Dairy Products Makers	1.1301	-0.0525	negative	-1.1301	-0.0593
Service Station Attendants	1.1301	-0.0525	negative	-1.1301	-0.0593

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Motor Vehicle Mechanics and Repairers	1.4571	-0.0412	negative	-1.4571	-0.0600
Bartenders	1.2400	-0.0494	negative	-1.2400	-0.0613
Tailors, Dressmakers, Furriers and Hatters	1.5097	-0.0470	negative	-1.5097	-0.0709
Plastic Products Machine Operators	1.3893	-0.0525	negative	-1.3893	-0.0730
Potters and Related Workers	1.1945	-0.0613	negative	-1.1945	-0.0733
Cooks	1.2756	-0.0587	negative	-1.2756	-0.0748
Electrical Mechanics and Fitters	1.5423	-0.0503	negative	-1.5423	-0.0776
Plasterers	1.5423	-0.0503	negative	-1.5423	-0.0776
Subsistence Livestock Farmer	1.5235	-0.0530	negative	-1.5235	-0.0808
Waiters	2.2603	-0.0384	negative	-2.2603	-0.0868
Bricklayers and Related Workers	2.3147	-0.0376	negative	-2.3147	-0.0869
Food Service Counter Attendants	1.4758	-0.0609	negative	-1.4758	-0.0899
Wood Treaters	1.696588	-0.05439	negative	-1.6966	-0.0923
Cabinet-makers and Related Workers	0.7452	-0.1324	negative	-0.7452	-0.0986
Garment and Related Patternmakers and Cutters	1.6758	-0.0624	negative	-1.6758	-0.1046
Miners and Quarriers	1.9518	-0.0559	negative	-1.9518	-0.1090
Blacksmiths, Hammersmiths and Forging Press Workers	1.4347	-0.0760	negative	-1.4347	-0.1091
Field Crop and Vegetable Growers	1.4352	-0.0796	negative	-1.4352	-0.1143
Mixed Crop Growers	1.4352	-0.0796	negative	-1.4352	-0.1143
Tree and Shrub Crop Growers	1.4352	-0.0796	negative	-1.4352	-0.1143

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Deep-sea Fishery Workers	1.8038	-0.0657	negative	-1.8038	-0.1185
Pet Groomers and Animal Care Workers	1.8038	-0.0657	negative	-1.8038	-0.1185
Freight Handlers	1.8303	-0.0650	negative	-1.8303	-0.1190
Security Guards	1.8303	-0.0650	negative	-1.8303	-0.1190
Musical Instrument Makers and Tuners	1.7704	-0.0702	negative	-1.7704	-0.1242
Jewellery and Precious metal Workers	1.3620	-0.1001	negative	-1.3620	-0.1364
Building Caretakers	2.1880	-0.0627	negative	-2.1880	-0.1371
Cleaning and Housekeeping Supervisors in Offices, Hotels and Other Establishments	2.1880	-0.0627	negative	-2.1880	-0.1371
Well Drillers and Borers and Related Workers	1.7670	-0.0787	negative	-1.7670	-0.1391
Undertakers and Embalmers	2.0938	-0.0674	negative	-2.0938	-0.1410
Beauticians and Related Workers	1.3110	-0.1142	negative	-1.3110	-0.1498
Painters and Related Workers	1.8920	-0.0794	negative	-1.8920	-0.1503
Street Food Salespersons	1.8920	-0.0794	negative	-1.8920	-0.1503
Wood Processing Plant Operators	3.0554	-0.0496	negative	-3.0554	-0.1514
Inland and Coastal Waters Fishery Workers	1.4998	-0.1019	negative	-1.4998	-0.1528
Health Care Assistants	1.3175	-0.1174	negative	-1.3175	-0.1546
Roofers	1.3175	-0.1174	negative	-1.3175	-0.1546
Sewing Machine Operators	2.3643	-0.0657	negative	-2.3643	-0.1552

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Livestock and Dairy Producers	1.5244	-0.1031	negative	-1.5244	-0.1572
Aircraft Engine Mechanics and Repairers	1.4084	-0.1124	negative	-1.4084	-0.1583
Metal Working Machine Tool Setters and Operators	1.7971	-0.0925	negative	-1.7971	-0.1662
Woodworking Machine Tool Setters and Operators	1.797079	-0.09248	negative	-1.7971	-0.1662
Personal Care Workers in Health Services Not Elsewhere Classified	1.9666	-0.0861	negative	-1.9666	-0.1694
Fiber Preparing, Spinning and Winding Machine Operators	3.2406	-0.0526	negative	-3.2406	-0.1704
Home-based Personal Care Workers	2.4736	-0.0690	negative	-2.4736	-0.1707
Hand and Pedal Vehicle Drivers	1.8071	-0.0975	negative	-1.8071	-0.1761
Poultry Producers	1.7178	-0.1042	negative	-1.7178	-0.1790
Print Finishing and Binding Workers	2.9171	-0.0622	negative	-2.9171	-0.1813
Bakers, Pastry-cooks and Confectionery Makers	2.0033	-0.0908	negative	-2.0033	-0.1820
Agricultural and Industrial Machinery Mechanics and Repairers	1.8903	-0.0996	negative	-1.8903	-0.1883
Bleaching, Dyeing and Fabric Cleaning Machine Operators	2.9447	-0.0663	negative	-2.9447	-0.1952
Protective Services Workers Not Elsewhere Classified	1.3577	-0.1453	negative	-1.3577	-0.1973

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Weaving and Knitting Machine Operators	3.0364	-0.0664	negative	-3.0364	-0.2016
Shoemakers and Related Workers	1.3971	-0.1458	negative	-1.3971	-0.2037
Gardeners, Horticultural and Nursery Growers	1.5038	-0.1411	negative	-1.5038	-0.2121
Upholsterers and Related Workers	1.5038	-0.1411	negative	-1.5038	-0.2121
Rubber Products Machine Operators	2.7042	-0.0800	negative	-2.7042	-0.2164
Fur and Leather Preparing Machine Operators	3.6614	-0.0594	negative	-3.6614	-0.2175
Animal Producers Not Elsewhere Classified	1.7130	-0.1307	negative	-1.7130	-0.2238
Glass and Ceramics Plant Operators	3.7391	-0.0607	negative	-3.7391	-0.2268
Electrical Line Installers and Repairers	1.4454	-0.1598	negative	-1.4454	-0.2310
Heavy Truck and Lorry Drivers	2.2603	-0.1049	negative	-2.2603	-0.2371
Mail Carriers and Sorting Clerks	2.2603	-0.1049	negative	-2.2603	-0.2371
Precision-instrument Makers and Repairers	2.2603	-0.1049	negative	-2.2603	-0.2371
Veterinary Technicians and Assistants	1.4037	-0.1708	negative	-1.4037	-0.2398
Laundry Machine Operators	3.1621	-0.0759	negative	-3.1621	-0.2400
Underwater Divers	1.8261	-0.1348	negative	-1.8261	-0.2462
Mixed Crop and Animal Producers	1.9701	-0.1296	negative	-1.9701	-0.2552
Power Production Plant Operators	2.4519	-0.1075	negative	-2.4519	-0.2636
Glaziers	1.4476	-0.1873	negative	-1.4476	-0.2711

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Police Officers	1.4476	-0.1873	negative	-1.4476	-0.2711
Companions and Valets	2.5518	-0.1098	negative	-2.5518	-0.2803
Crane, Hoist and Related Plant Operators	4.1664	-0.0676	negative	-4.1664	-0.2816
Earthmoving and Related Plant Operators	4.1664	-0.0676	negative	-4.1664	-0.2816
Food and Related Products Machine Operators	4.1664	-0.0676	negative	-4.1664	-0.2816
Hand Packers	4.1664	-0.0676	negative	-4.1664	-0.2816
Packing, Bottling and Labelling Machine Operators	4.1664	-0.0676	negative	-4.1664	-0.2816
Paper Products Machine Operators	4.1664	-0.0676	negative	-4.1664	-0.2816
Shoemaking and Related Machine Operators	4.1664	-0.0676	negative	-4.1664	-0.2816
Textile, Fur and Leather Products Machine Operators Not Elsewhere Classified	4.1664	-0.0676	negative	-4.1664	-0.2816
Glass Makers, Cutters, Grinders and Finishers	2.3681	-0.1217	negative	-2.3681	-0.2881
Aquaculture Workers	2.7287	-0.1108	negative	-2.7287	-0.3024
Plumbers and Pipe Fitters	1.5951	-0.1963	negative	-1.5951	-0.3131
Electronics Mechanics and Servicers	1.5179	-0.2181	negative	-1.5179	-0.3311
Nursing Associate professionals	2.5888	-0.1286	negative	-2.5888	-0.3330
Travel Attendants and Travel Stewards	2.7750	-0.1219	negative	-2.7750	-0.3382
Prison Guards	3.1973	-0.1080	negative	-3.1973	-0.3454

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Teachers' Aides	3.1973	-0.1080	negative	-3.1973	-0.3454
Metal Polishers, Wheel Grinders and Tool Sharpeners	2.5435	-0.1360	negative	-2.5435	-0.3459
Cement, Stone and Other Mineral Products Machine Operators	2.2061	-0.1574	negative	-2.2061	-0.3473
Transport Conductors	2.6279	-0.1349	negative	-2.6279	-0.3545
Information and Communications Technology Operations Technicians	2.9515	-0.1218	negative	-2.9515	-0.3595
Forestry and Related Workers	1.8020	-0.2008	negative	-1.8020	-0.3619
Metal Finishing, Plating and Coating Machine Operators	3.3932	-0.1088	negative	-3.3932	-0.3691
Electrical and Electronic Equipment Assemblers	2.7458	-0.1484	negative	-2.7458	-0.4076
Lifting Truck Operators	2.7458	-0.1484	negative	-2.7458	-0.4076
Mineral and Stone Processing Plant Operators	3.1693	-0.1335	negative	-3.1693	-0.4231
Railway Brake, Signal and Switch Operators	3.1693	-0.1335	negative	-3.1693	-0.4231
Sheet Metal Workers	1.7019	-0.2537	negative	-1.7019	-0.4317
Refuse Sorters	2.9411	-0.1474	negative	-2.9411	-0.4335
Metal Processing Plant Operators	2.6708	-0.1706	negative	-2.6708	-0.4556
Air Conditioning and Refrigeration Mechanics	1.8685	-0.2510	negative	-1.8685	-0.4690

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Building and Related Electricians	1.8685	-0.2510	negative	-1.8685	-0.4690
Chemical Processing Plant Controllers	2.3006	-0.2049	negative	-2.3006	-0.4714
Gallery, Museum and Library Technicians	2.3147	-0.2040	negative	-2.3147	-0.4723
Ambulance Workers	3.1433	-0.1523	negative	-3.1433	-0.4788
Chemical Products Plant and Machine Operators	3.0119	-0.1624	negative	-3.0119	-0.4892
Ships' Engineers	3.0937	-0.1589	negative	-3.0937	-0.4915
Street Vendors (excluding Food)	3.0937	-0.1589	negative	-3.0937	-0.4915
Printers	3.0972	-0.1674	negative	-3.0972	-0.5186
Travel Guides	3.3912	-0.1540	negative	-3.3912	-0.5221
Dental Assistants and Therapists	1.7902	-0.2922	negative	-1.7902	-0.5231
Door-to-door Salespersons	3.2509	-0.1638	negative	-3.2509	-0.5324
Metal Production Process Controllers	3.3854	-0.1605	negative	-3.3854	-0.5435
Photographers	1.7545	-0.3147	negative	-1.7545	-0.5522
Toolmakers and Related Workers	1.9575	-0.2841	negative	-1.9575	-0.5561
Steam Engine and Boiler Operators	2.4813	-0.2324	negative	-2.4813	-0.5766
Shop Sales Assistants	3.2856	-0.1769	negative	-3.2856	-0.5812
Pulp and Papermaking Plant Operators	2.8314	-0.2089	negative	-2.8314	-0.5916
Chemical and Physical Science Technicians	1.8798	-0.3147	negative	-1.8798	-0.5917
Medical and Dental Prosthetic Technicians	2.3805	-0.2502	negative	-2.3805	-0.5957
Shelf Fillers	3.3528	-0.1799	negative	-3.3528	-0.6032

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Photographic Products Machine Operators	3.3331	-0.1818	negative	-3.3331	-0.6061
Creative and Performing Artists Not Elsewhere Classified	5.0646	-0.1197	negative	-5.0646	-0.6062
Dancers and Choreographers	5.0646	-0.1197	negative	-5.0646	-0.6062
Fashion and Other Models	5.0646	-0.1197	negative	-5.0646	-0.6062
Signwriters, Decorative Painters, Engravers and Etchers	1.9376	-0.3136	negative	-1.9376	-0.6077
Shotfirers and Blasters	2.4002	-0.2541	negative	-2.4002	-0.6100
Conference and Event Planners	4.5707	-0.1358	negative	-4.5707	-0.6206
Stall and Market Salespersons	2.6000	-0.2398	negative	-2.6000	-0.6235
Assemblers Not Elsewhere Classified	3.5180	-0.1814	negative	-3.5180	-0.6381
Mechanical Machinery Assemblers	3.5180	-0.1814	negative	-3.5180	-0.6381
Construction Supervisors	4.0687	-0.1573	negative	-4.0687	-0.6398
Personal Services Workers Not Elsewhere Classified	4.0687	-0.1573	negative	-4.0687	-0.6398
Contact Centre Salespersons	3.9890	-0.1619	negative	-3.9890	-0.6460
Debt Collectors and Related Workers	3.9471	-0.1648	negative	-3.9471	-0.6503
Customs and Border Inspectors	2.7846	-0.2389	negative	-2.7846	-0.6652
Messengers, Package Deliverers and Luggage Porters	3.6649	-0.1899	negative	-3.6649	-0.6959

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Broadcasting and Audiovisual Technicians	2.5963	-0.2688	negative	-2.5963	-0.6978
Information and Communications Technology User Support Technicians	2.9401	-0.2382	negative	-2.9401	-0.7002
Sales Demonstrators	3.7868	-0.1873	negative	-3.7868	-0.7093
Health Associate Professionals Not Elsewhere Classified	3.7899	-0.1901	negative	-3.7899	-0.7205
Air Traffic Controllers	2.5447	-0.2866	negative	-2.5447	-0.7292
Incinerator and Water Treatment Plant Operators	3.0183	-0.2436	negative	-3.0183	-0.7353
Meter Readers and Vending-machine Collectors	3.7704	-0.1960	negative	-3.7704	-0.7388
Athletes and Sports Players	2.7124	-0.2725	negative	-2.7124	-0.7391
Client Information Workers Not Elsewhere Classified	3.8065	-0.1948	negative	-3.8065	-0.7416
Petroleum and Natural Gas Refining Plant Operators	3.0015	-0.2504	negative	-3.0015	-0.7515
Ships' Deck Officers and Pilots	3.1043	-0.2454	negative	-3.1043	-0.7618
Elementary Workers Not Elsewhere Classified	3.8498	-0.2005	negative	-3.8498	-0.7719
Administrative and Executive Secretaries	3.8822	-0.2042	negative	-3.8822	-0.7928
Pharmaceutical Technicians and Assistants	3.9117	-0.2041	negative	-3.9117	-0.7982
Medical Assistants	3.9537	-0.2098	negative	-3.9537	-0.8296
Dentists	3.4444	-0.2410	negative	-3.4444	-0.8303

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Cashiers and Ticket Clerks	3.9341	-0.2118	negative	-3.9341	-0.8331
Business Services Agents Not Elsewhere Classified	4.0116	-0.2136	negative	-4.0116	-0.8569
Library Clerks	4.0116	-0.2136	negative	-4.0116	-0.8569
Medical Records and Health Information Technicians	4.0116	-0.2136	negative	-4.0116	-0.8569
Restaurant Managers	3.6907	-0.2345	negative	-3.6907	-0.8654
Midwifery Associate professionals	2.7710	-0.3147	negative	-2.7710	-0.8721
Information and Communications Technology Sales Professionals	4.0578	-0.2163	negative	-4.0578	-0.8776
Legal Secretaries	4.0578	-0.2163	negative	-4.0578	-0.8776
Aircraft Pilots and Related Associate Professionals	2.6694	-0.3394	negative	-2.6694	-0.9059
Child Care Workers	3.6666	-0.2491	negative	-3.6666	-0.9133
Religious Professionals	4.6724	-0.1971	negative	-4.6724	-0.9211
Actors	3.7683	-0.2515	negative	-3.7683	-0.9476
Real Estate Agents and Property Managers	3.5771	-0.2676	negative	-3.5771	-0.9571
Employment Agents and Contractors	3.6356	-0.2734	negative	-3.6356	-0.9941
Traditional Chiefs and Heads of Villages	4.5697	-0.2193	negative	-4.5697	-1.0020
Shop Supervisors	3.6162	-0.2773	negative	-3.6162	-1.0026
Traditional and Complementary Medicine Associate Professionals	2.9014	-0.3471	negative	-2.9014	-1.0071
Fitness and Recreation	3.9794	-0.2546	negative	-3.9794	-1.0134

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Instructors and Programme Leaders					
Religious Associate Professionals	3.9794	-0.2546	negative	-3.9794	-1.0134
Bank Tellers and Related Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Clearing and Forwarding Agents	4.4107	-0.2324	negative	-4.4107	-1.0249
Clerical Support Workers Not Elsewhere Classified	4.4107	-0.2324	negative	-4.4107	-1.0249
Coding, Proof-reading and Related clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Data Entry Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Filing and Copying Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Food and Beverage Tasters and Graders	4.4107	-0.2324	negative	-4.4107	-1.0249
General Office Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Hotel Receptionists	4.4107	-0.2324	negative	-4.4107	-1.0249
Inquiry Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Payroll Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Personnel Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Production Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Receptionists (general)	4.4107	-0.2324	negative	-4.4107	-1.0249
Secretaries (general)	4.4107	-0.2324	negative	-4.4107	-1.0249
Stock Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Transport Clerks	4.4107	-0.2324	negative	-4.4107	-1.0249
Typists and Word Processing Operators	4.4107	-0.2324	negative	-4.4107	-1.0249
Telephone Switchboard Operators	3.2450	-0.3163	negative	-3.2450	-1.0264
Trade Brokers	3.5153	-0.2922	negative	-3.5153	-1.0272
Physiotherapy Technicians and Assistants	2.8110	-0.3659	negative	-2.8110	-1.0285

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Hotel Managers	3.6193	-0.2929	negative	-3.6193	-1.0601
Office Supervisors	4.4957	-0.2359	negative	-4.4957	-1.0604
Announcers on Radio, Television and Other Media	3.5053	-0.3042	negative	-3.5053	-1.0662
Survey and Market Research Interviewers	3.5053	-0.3042	negative	-3.5053	-1.0662
Buyers	3.8137	-0.2816	negative	-3.8137	-1.0741
Primary School Teachers	3.8137	-0.2816	negative	-3.8137	-1.0741
Nursing Professionals	3.0472	-0.3597	negative	-3.0472	-1.0960
Information and Communications Technology Services Managers	4.4500	-0.2464	negative	-4.4500	-1.0966
Chefs	3.3690	-0.3259	negative	-3.3690	-1.0978
Commercial Sales Representatives	3.7230	-0.2998	negative	-3.7230	-1.1160
Credit and Loans Officers	3.6406	-0.3110	negative	-3.6406	-1.1322
Community Health Workers	4.3968	-0.2591	negative	-4.3968	-1.1392
Early Childhood Educators	4.3340	-0.2746	negative	-4.3340	-1.1901
Policy and Planning Managers	4.3340	-0.2746	negative	-4.3340	-1.1901
Bookmakers, Croupiers and Related Gaming Workers	2.8697	-0.4151	negative	-2.8697	-1.1913
Special Needs Teachers	3.5358	-0.3405	negative	-3.5358	-1.2041
Medical Imaging and Therapeutic Equipment Technicians	3.4444	-0.3503	negative	-3.4444	-1.2066
Medical Secretaries	3.4444	-0.3503	negative	-3.4444	-1.2066
Secondary Education Teachers	3.1699	-0.3807	negative	-3.1699	-1.2069

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Agricultural Technicians	2.6495	-0.4595	negative	-2.6495	-1.2176
Construction Managers	3.7008	-0.3303	negative	-3.7008	-1.2223
Traditional and Complementary Medicine Professionals	3.4999	-0.3510	negative	-3.4999	-1.2286
Audiologists and Speech Therapists	3.4084	-0.3671	negative	-3.4084	-1.2514
Web Technicians	3.4084	-0.3671	negative	-3.4084	-1.2514
Advertising and Public Relations Managers	4.2593	-0.2940	negative	-4.2593	-1.2521
Finance Managers	4.2593	-0.2940	negative	-4.2593	-1.2521
Research and Development Managers	4.2593	-0.2940	negative	-4.2593	-1.2521
Sales and Marketing Managers	4.2593	-0.2940	negative	-4.2593	-1.2521
Forestry Technicians	3.6162	-0.3513	negative	-3.6162	-1.2706
Paramedical Practitioners	3.6370	-0.3497	negative	-3.6370	-1.2719
Product Graders and Testers (excluding Foods and Beverages)	3.6370	-0.3497	negative	-3.6370	-1.2719
Environmental and Occupational Health Inspectors and Associates	3.4025	-0.3739	negative	-3.4025	-1.2721
Pre-press Technicians	4.0411	-0.3159	negative	-4.0411	-1.2764
Travel Consultants and Clerks	4.0411	-0.3159	negative	-4.0411	-1.2764
Midwifery Professionals	3.5730	-0.3644	negative	-3.5730	-1.3019
Health Services Managers	3.8440	-0.3401	negative	-3.8440	-1.3073

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Computer Network and Systems Technicians	3.9886	-0.3298	negative	-3.9886	-1.3153
Contact Centre Information Clerks	3.9886	-0.3298	negative	-3.9886	-1.3153
Film, Stage and Related Directors and Producers	4.1698	-0.3189	negative	-4.1698	-1.3296
Aquaculture and Fisheries Production Managers	3.8904	-0.3428	negative	-3.8904	-1.3338
Insurance Representatives	3.6305	-0.3708	negative	-3.6305	-1.3463
Sports, Recreation and Cultural Centre Managers	3.3978	-0.4021	negative	-3.3978	-1.3664
University and Higher Education Teachers	3.7542	-0.3646	negative	-3.7542	-1.3687
Accounting and Bookkeeping Clerks	3.9200	-0.3493	negative	-3.9200	-1.3691
Government Licensing Officials	3.9200	-0.3493	negative	-3.9200	-1.3691
Pawnbrokers and Money-lenders	3.9200	-0.3493	negative	-3.9200	-1.3691
Life Science Technicians (excluding Medical)	3.4673	-0.3995	negative	-3.4673	-1.3852
Police Inspectors and Detectives	3.1257	-0.4445	negative	-3.1257	-1.3894
Driving Instructors	4.0627	-0.3520	negative	-4.0627	-1.4303
Manufacturing Supervisors	4.0627	-0.3520	negative	-4.0627	-1.4303
Professional Services Managers Not Elsewhere Classified	4.0627	-0.3520	negative	-4.0627	-1.4303
Database and Network Professionals Not Elsewhere Classified	3.3811	-0.4233	negative	-3.3811	-1.4314

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Securities and Finance Dealers and Brokers	3.4977	-0.4211	negative	-3.4977	-1.4727
Specialist Medical Practitioners	3.5438	-0.4178	negative	-3.5438	-1.4805
Education Managers	4.0023	-0.3732	negative	-4.0023	-1.4935
Human Resource Managers	4.0023	-0.3732	negative	-4.0023	-1.4935
Teaching Professionals Not Elsewhere Classified	4.0023	-0.3732	negative	-4.0023	-1.4935
Aged Care Services Managers	3.6817	-0.4098	negative	-3.6817	-1.5087
Vocational Education Teachers	3.6817	-0.4098	negative	-3.6817	-1.5087
Technical and Medical Sales Professionals (excluding ICT)	3.3855	-0.4477	negative	-3.3855	-1.5157
Legislators	3.9812	-0.3811	negative	-3.9812	-1.5172
Physiotherapists	3.4018	-0.4506	negative	-3.4018	-1.5329
Retail and Wholesale Trade Managers	3.4018	-0.4506	negative	-3.4018	-1.5329
Dieticians and Nutritionists	3.5670	-0.4345	negative	-3.5670	-1.5500
Agricultural and Forestry Production Managers	3.6991	-0.4195	negative	-3.6991	-1.5519
Child Care Services Managers	3.4481	-0.4545	negative	-3.4481	-1.5673
Other Arts Teachers	3.9381	-0.3985	negative	-3.9381	-1.5694
Veterinarians	3.7084	-0.4272	negative	-3.7084	-1.5841
Air Traffic Safety Electronics Technicians	3.3922	-0.4671	negative	-3.3922	-1.5844
Building Architects	3.3922	-0.4671	negative	-3.3922	-1.5844
Landscape Architects	3.3922	-0.4671	negative	-3.3922	-1.5844

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Sports Coaches, Instructors and Officials	3.4094	-0.4673	negative	-3.4094	-1.5931
Optometrists and Ophthalmic Opticians	3.4223	-0.4667	negative	-3.4223	-1.5973
Shopkeepers	3.4223	-0.4667	negative	-3.4223	-1.5973
Supply, Distribution and Related Managers	3.9119	-0.4101	negative	-3.9119	-1.6044
Pharmacists	3.4002	-0.4761	negative	-3.4002	-1.6188
Other Music Teachers	3.6448	-0.4468	negative	-3.6448	-1.6284
Social Work and Counselling Professionals	3.6448	-0.4468	negative	-3.6448	-1.6284
Financial and Insurance Services Branch Managers	3.8599	-0.4365	negative	-3.8599	-1.6850
Statistical, Finance and Insurance Clerks	3.6439	-0.4661	negative	-3.6439	-1.6985
Systems Administrators	3.6439	-0.4661	negative	-3.6439	-1.6985
Dispensing Opticians	3.4324	-0.4964	negative	-3.4324	-1.7038
Civil Engineering Technicians	3.2333	-0.5287	negative	-3.2333	-1.7095
Public Relations Professionals	3.5585	-0.4823	negative	-3.5585	-1.7163
Accounting Associate Professionals	3.4268	-0.5058	negative	-3.4268	-1.7332
Financial and Investment Advisers	3.4268	-0.5058	negative	-3.4268	-1.7332
Physical and Engineering Science Technicians Not Elsewhere Classified	3.2231	-0.5501	negative	-3.2231	-1.7729
Business Services and Administration Managers Not Elsewhere Classified	3.8122	-0.4682	negative	-3.8122	-1.7850

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Lawyers	3.8122	-0.4682	negative	-3.8122	-1.7850
Musicians, Singers and Composers	3.8122	-0.4682	negative	-3.8122	-1.7850
Social Welfare Managers	3.8122	-0.4682	negative	-3.8122	-1.7850
Social Work Associate Professionals	3.8122	-0.4682	negative	-3.8122	-1.7850
Mechanical Engineering Technicians	3.2671	-0.5658	negative	-3.2671	-1.8483
Environmental Engineers	3.4765	-0.5320	negative	-3.4765	-1.8495
Management and Organization Analysts	3.4765	-0.5320	negative	-3.4765	-1.8495
Managing Directors and Chief Executives	3.7810	-0.4999	negative	-3.7810	-1.8901
Government Regulatory Associate Professionals Not Elsewhere Classified	3.6033	-0.5246	negative	-3.6033	-1.8902
Government Social Benefits Officials	3.6033	-0.5246	negative	-3.6033	-1.8902
Generalist Medical Practitioners	3.4965	-0.5409	negative	-3.4965	-1.8912
Senior Government Officials	3.7763	-0.5070	negative	-3.7763	-1.9144
Senior Officials of Special-interest Organizations	3.7763	-0.5070	negative	-3.7763	-1.9144
Medical and Pathology Laboratory Technicians	3.2684	-0.5995	negative	-3.2684	-1.9593
Industrial and Production Engineers	3.5242	-0.5605	negative	-3.5242	-1.9752
Education Methods Specialists	3.6034	-0.5492	negative	-3.6034	-1.9790

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Manufacturing Managers	3.7678	-0.5263	negative	-3.7678	-1.9831
Archivists and Curators	3.5339	-0.5717	negative	-3.5339	-2.0205
Mining Managers	3.7658	-0.5379	negative	-3.7658	-2.0257
Mining Supervisors	3.7658	-0.5379	negative	-3.7658	-2.0257
Health Professionals Not Elsewhere Classified	3.5526	-0.5835	negative	-3.5526	-2.0731
Other Language Teachers	3.5526	-0.5835	negative	-3.5526	-2.0731
Training and Staff Development Professionals	3.7670	-0.5554	negative	-3.7670	-2.0921
Chemical Engineering Technicians	3.6318	-0.5830	negative	-3.6318	-2.1173
Software and Applications Developers and Analysts Not Elsewhere Classified	3.6318	-0.5830	negative	-3.6318	-2.1173
Valuers and Loss Assessors	3.6318	-0.5830	negative	-3.6318	-2.1173
Draughtspersons	3.6496	-0.5976	negative	-3.6496	-2.1810
Mining and Metallurgical Technicians	3.6496	-0.5976	negative	-3.6496	-2.1810
Information Technology Trainers	3.7806	-0.5844	negative	-3.7806	-2.2094
Environmental and Occupational Health and Hygiene Professionals	3.6925	-0.6189	negative	-3.6925	-2.2853
Librarians and Related Information Professionals	3.6885	-0.6220	negative	-3.6885	-2.2941
Scribes and Related Workers	3.6885	-0.6220	negative	-3.6885	-2.2941

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Translators, Interpreters and Other Linguists	3.6885	-0.6220	negative	-3.6885	-2.2941
Environmental Protection Professionals	3.6938	-0.6337	negative	-3.6938	-2.3408
Judges	3.8135	-0.6176	negative	-3.8135	-2.3552
Systems Analysts	3.8135	-0.6176	negative	-3.8135	-2.3552
Computer Network Professionals	3.7466	-0.6498	negative	-3.7466	-2.4345
Electronics Engineering Technicians	3.7466	-0.6498	negative	-3.7466	-2.4345
Electrical Engineering Technicians	3.6229	-0.6769	negative	-3.6229	-2.4522
Cartographers and Surveyors	3.7597	-0.6566	negative	-3.7597	-2.4685
Farming, Forestry and Fisheries Advisers	3.8501	-0.6425	negative	-3.8501	-2.4737
Software Developers	3.8501	-0.6425	negative	-3.8501	-2.4737
Physicists and Astronomers	3.7649	-0.6574	negative	-3.7649	-2.4750
Government Tax and Excise Officials	3.7995	-0.6707	negative	-3.7995	-2.5482
Legal Professionals Not Elsewhere Classified	3.7995	-0.6707	negative	-3.7995	-2.5482
Mining Engineers, Metallurgists and Related Professionals	3.8854	-0.6619	negative	-3.8854	-2.5716
Psychologists	3.8854	-0.6619	negative	-3.8854	-2.5716
Telecommunications Engineers	3.7272	-0.6969	negative	-3.7272	-2.5973
Interior Designers and Decorators	3.9178	-0.6773	negative	-3.9178	-2.6537
Journalists	3.9178	-0.6773	negative	-3.9178	-2.6537

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Telecommunications Engineering Technicians	3.9178	-0.6773	negative	-3.9178	-2.6537
Web and Multimedia Developers	3.9178	-0.6773	negative	-3.9178	-2.6537
Electronics Engineers	3.8057	-0.7119	negative	-3.8057	-2.7091
Applications Programmers	3.8860	-0.6999	negative	-3.8860	-2.7198
Personnel and Careers Professionals	3.8860	-0.6999	negative	-3.8860	-2.7198
Astrologers, Fortune-tellers and Related Workers	3.9732	-0.7006	negative	-3.9732	-2.7836
Electrical Engineers	3.9732	-0.7006	negative	-3.9732	-2.7836
Authors and Related Writers	3.9515	-0.7194	negative	-3.9515	-2.8426
Database Designers and Administrators	3.9515	-0.7194	negative	-3.9515	-2.8426
Civil Engineers	4.0176	-0.7172	negative	-4.0176	-2.8813
Policy Administration Professionals	4.0176	-0.7172	negative	-4.0176	-2.8813
Mechanical Engineers	4.0018	-0.7333	negative	-4.0018	-2.9345
Philosophers, Historians and Political Scientists	4.0535	-0.7296	negative	-4.0535	-2.9575
Statistical, Mathematical and Related Associate Professionals	4.0535	-0.7296	negative	-4.0535	-2.9575
Town and Traffic Planners	4.0535	-0.7296	negative	-4.0535	-2.9575
Accountants	4.0415	-0.7437	negative	-4.0415	-3.0057
Biologists, Botanists, Zoologists and Related Professionals	4.0415	-0.7437	negative	-4.0415	-3.0057

Occupation	Distance	Direction	Sign of the direction	Occupational distance (sign only)	Overall occupational distance measure
Chemical Engineers	4.0415	-0.7437	negative	-4.0415	-3.0057
Advertising and Marketing Professionals	4.0828	-0.7393	negative	-4.0828	-3.0185
Chemists	4.0828	-0.7393	negative	-4.0828	-3.0185
Engineering Professionals Not Elsewhere Classified	4.0828	-0.7393	negative	-4.0828	-3.0185
Product and Garment Designers	4.0828	-0.7393	negative	-4.0828	-3.0185
Financial Analysts	4.0734	-0.7518	negative	-4.0734	-3.0625
Meteorologists	4.0734	-0.7518	negative	-4.0734	-3.0625
Graphic and Multimedia Designers	4.1072	-0.7471	negative	-4.1072	-3.0683
Mathematicians, Actuaries and Statisticians	4.1072	-0.7471	negative	-4.1072	-3.0683
Economists	4.3603	-0.8168	negative	-4.3603	-3.5614
Geologists and Geophysicists	4.3603	-0.8168	negative	-4.3603	-3.5614
Sociologists, Anthropologists and Related Professionals	4.3603	-0.8168	negative	-4.3603	-3.5614
Visual Artists	4.3603	-0.8168	negative	-4.3603	-3.5614

Both Tables 3 and 4 provide significant evidence pointing to the validity of the occupational distance and direction measures we developed and estimated. These tables can be duplicated for the rest of the 422 occupations. Note that selecting and comparing any pair of occupations is arbitrary. What is more interesting is looking at actual panel data of individuals moving across occupations over time. The next section presents an example of an application of these measures among individuals, particularly among TVET graduates⁹.

Application of the overall occupational distance measure: case of TVET graduates

We use the 2014 Technical-Vocational Education and Training (TVET) graduate tracer survey of Technical Education and Skills Development Authority (TESDA) as the source of occupation

⁹ Lack of panel data of working individuals prevents us from applying the distance and direction measures on a broader and more nationally representative population.

information individuals. We estimate the distance between the occupations – pre-training and post-training - of individual TVET graduates in 2014.

Summary statistics of distance measures

Given the task portfolios of occupations derived in the previous subsection, we estimate Equation 1 and compute for the distance between the two occupations – pre-training and post-training - of individual TVET graduates in 2014. The task portfolio of an occupation can be defined in terms of three, four or five combinations of task types. The calculation of the Euclidean distance thus depends on the type of task classification scheme adopted¹⁰.

Table 5 presents the summary statistics of the calculated Euclidean distance measures by type of classification scheme including the coefficient of variation (CV). The table suggests that there is a significant difference in the distance between occupations, thus rationalizing the use of an empirical measure of distance when determining the effects of occupational moves rather than merely employing a dummy indicator for occupational change.

Table 5. Summary Statistics of the Distance Measures

Task Classification Scheme	Number of Observations	Mean	Standard Deviation	Coefficient of Variation	Min	Max
Autor et al. [2003]	1,781	0.329	0.579	1.756	0	2.607
Ingram and Neumann [2006]	1,721	0.252	0.473	1.877	0	2.624
Autor and Handel [2013]	1,781	0.328	0.610	1.859	0	2.528
Gathmann and Schönberg [2010]	1,781	0.315	0.571	1.812	0	3.067

¹⁰ The task classification scheme can be two-, three, four- or five-dimensional. See Generalao [2019b] for more details.

Results of distance measure applied to TVET graduates

Tables 6 to 8 allow us to analyze the distance measures of selected outlying occupational pairings. The third column in each table contains the calculated Euclidean distance measure for the corresponding pairing.

The calculated distance measures in Table 6 are close to zero, so the pairs of occupations are classified as being very similar and thus the least distant with each other. The results make sense since the nature of the tasks to be performed in the current occupation is analogous with that of the trainee's previous occupation. On the other hand, Table 7 shows which occupations are completely similar with each other as represented by the zero value of the Euclidean distance. Building caretakers' tasks are similar in nature with those of cleaning and housekeeping supervisors. Typists and word processing operators perform essentially the same job as data entry clerks.

Table 6. Least Distant Occupations among TVET graduates

Occupation in Period 1	Occupation in Period 2	Euclidean Distance Measure
Handicraft workers in textile, leather and related materials	Sewing, embroidery and related workers	0.025
Stonemasons, stone cutters, splitters and carvers	Structural-metal preparers and erectors	0.050
Building construction laborers	Civil engineering laborers	0.083
Motorcycle drivers	Motor vehicle mechanics and repairers	0.106
Motorcycle drivers	Stonemasons, stone cutters, splitters and carvers	0.121

Table 7. Similar Occupations among TVET graduates

Occupation in Period 1	Occupation in Period 2	Euclidean Distance Measure
Stock clerks	General office clerks	0
Typists and word processing operators	Data entry clerks	0
Secretaries (general)	General office clerks	0
Cleaning and housekeeping supervisors in offices, hotels and other establishments	Building caretakers	0
Car, taxi and van drivers	Welders and flame cutters	0

Finally, Table 8 tells us which pairs of occupations are the most distant to each other; that is, these occupational pairs are considered the most different from each other in terms of their skill vectors defined by their task contents. However, the conclusions we can derive from these results are fairly limited. The distance measure only provides us a measurement of how different the two occupations are. From Table 8, classifying an occupational move, say from working as a secretary to a sales and marketing manager is almost no different compared to a move from being a policy administration professional to a general office clerk. Clearly, the distance measure simply reveals the magnitude of the similarity or difference between two occupations based on the nature of

tasks performed. It does not tell us whether an occupational move is an upskilling, down-skilling or merely a lateral move. Thus, we need to add a direction measure to derive a better overall occupational distance measure.

Table 8. Most Distant Occupational Pairings among TVET graduates

Occupation in Period 1	Occupation in Period 2	Euclidean Distance Measure
General office clerks	Paper products machine operators	2.607
Waiters	Packing, bottling and labeling machine operators	2.361
Secretaries (general)	Sales and marketing managers	2.197
Typists and word processing operators	Graphic and multimedia designers	2.138
Policy administration professionals	General office clerks	2.104

Summary statistics of the overall occupational distance measure

This section summarizes the results of measuring the occupational mobility of TVET graduates as represented by the overall occupational distance measure defined in Equation 6 above; that is, individual TVET graduates moving from one occupation to another between two periods. As previously discussed, we note that occupational distance is obtained from the product of distance and direction measures. Table 9 presents the summary statistics for all the overall occupational distance measures.

Table 9. Summary Statistics of the Overall Occupational Distance Measures

Basis of Task Classification Scheme	Number of Observations	Mean	Standard Deviation	Coefficient of Variation	Min	Max
Autor et al. [2003]	1,781	0.004	0.154	41.042	-1.182	1.534
Ingram and Neumann [2006]	1,721	0.001	0.105	73.176	-0.771	0.791
Autor and Handel [2013]	1,781	0.004	0.128	33.416	-0.821	0.847
Gathmann and Schönberg [2010]	1,781	-0.002	0.102	-54.501	-0.703	0.566

Results of the overall occupational distance measure applied to TVET graduates

Tables 10 to 12 summarize the top occupational moves in terms of the magnitude of the overall occupational distance measure. Note that the direction measure used here is weighted and considers the five task categories defined by Autor et al. [2003]. The weights are presented in Column 1 of Table 2. The occupational moves can be classified as either upskilling, down-skilling and lateral moves.

Table 10 tells us the occupational moves that are estimated to have the largest accumulation of human capital from the increased skill vector of the individual. Using this overall distance measure, the data reveals that 16.23 percent of the individuals in the sample experience upward skill mobility after approximately a year.

Table 10. Top Occupational Moves - Upward Skill Mobility

Occupation in Period 1	Occupation in Period 2	Overall Occupational Distance Measure
Motorcycle drivers	Visual artists	1.534
Building construction laborers	Graphic and multimedia designers	1.408
Typists and word processing operators	Graphic and multimedia designers	1.100
Construction supervisors	Civil engineers	0.990
Crop farm laborers	Other language teachers	0.909

On the other hand, Table 11 suggests the exact opposite of Table 10 and indicates the mobility associated with human capital loss. Specifically, 14.60 percent of the sample experience downward skill mobility.

Table 11. Top Occupational Moves - Downward Skill Mobility

Occupation in Period 1	Occupation in Period 2	Overall Occupational Distance Measure
Mechanical engineers	Motor vehicle mechanics and repairers	-1.182
Policy administration professionals	General office clerks	-1.020
Shopkeepers	Hand packers	-0.914
Shopkeepers	Packing, bottling and labeling machine operators	-0.914
Shopkeepers	Building construction laborers	-0.742

Both Tables 10 and 11 show which combinations of occupations exhibit low skill transferability; that is, a high absolute value of the distance measure.

Table 12 summarizes which pairs of occupations have highly transferable skills. The model predicts that there is no human capital gain or loss in this type of occupational move.

Table 12. Top Occupational Moves - Lateral Occupational Move

Occupation in Period 1	Occupation in Period 2	Overall Occupational Distance Measure
Stock clerks	General office clerks	0
General office clerks	Stock clerks	0
General office clerks	Receptionists (general)	0
Typists and word processing operators	Data entry clerks	0
Secretaries (general)	General office clerks	0

The most and least distant (upward and downward) occupational moves for the other methodologies are elaborated on in Appendices 2 and 3. The use of the unweighted sum of components to define a direction measure leads to counterintuitive and inconsistent results as evidenced by the descriptive statistics presented in Appendix 2. For instance, a hand packer becoming a building electrician would not likely be considered a down-skilling occupational move (See Table 2 of Appendix 2). Tables 1 and 4 of the same section also show a counterintuitive result classifying an occupational move of a shopkeeper to a hand packer as an upskilling. These counterintuitive results justify the use of the weighted direction measure which resulted in more sensible occupational move classifications (refer to Appendix 3). For example, a building construction laborer becoming a graphic and multimedia designer is definitely considered an upskilling (see Table 1 of Appendix 3) while teaching professionals shifting to motorcycle drivers is clearly a down-skilling (see Table 2 of Appendix 3).

Conclusions and ways forward

In this age of rapidly evolving labor markets, the flexibility of skills becomes an important consideration for the working population. The employability of certain skills varies across sectors, industries, firms or even across occupations. Using the task-based framework, this study measures the level of skill transferability across occupations by building an occupational distance measure. The distance measure allows us to compare occupations in terms of their task profiles. Skill transferability between two occupations is high if the occupations are 'close' with each other and low if occupations are 'far' from each. In addition, the distance measure allows us to classify which occupational moves are considered an upskilling, down-skilling or lateral occupational moves. This has important implications in terms of the amount of additional training and education needed by individuals to move from one occupation to another.

The occupational distance measure is also applied to the sample of TVET graduates to measure their level of occupational mobility pre- and post-training. This paper recommends the use of a larger data set to capture the behavior of the entire labor force and not just post-training graduates. This should provide better insights on the relationship among occupational distances, mobility and wage differentials in different economies.

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Appendix 1.

Descriptive Statistics of the Overall Occupational Distance Measures: Using Direction Measure as an Unweighted Sum of Components

Table 1. Top 5 Upward Skill Mobility - Distances using Unweighted Sum of Components

Occupation in Period 1	Occupation in Period 2
General office clerks	Paper products machine operators
Butchers, fishmongers and related food preparers	Textile, fur and leather products machine operators not elsewhere classified
Waiters	Packing, bottling and labeling machine operators
Shopkeepers	Hand packers
Shopkeepers	Packing, bottling and labeling machine operators

Table 2. Top 10 Downward Skill Mobility - Distances using Unweighted Sum of Components

Occupation in Period 1	Occupation in Period 2
Paper products machine operators	Motor vehicle mechanics and repairers
Hand packers	Building and related electricians
Hand packers	Rice farmers
Rubber products machine operators	Motor vehicle mechanics and repairers
Teaching professionals not elsewhere classified	Motorcycle drivers

Table 3. Top 3 Lateral Occupational Move using Unweighted Sum of Components

Occupation in Period 1	Occupation in Period 2
Stock clerks	General office clerks
General office clerks	Stock clerks
General office clerks	Receptionists (general)
Typists and word processing operators	Data entry clerks
Secretaries (general)	General office clerks

**Table 4. Top 5 Upward Skill Mobility - Distances using Unweighted Sum of Components
[Ingram and Neumann 2006]**

Occupation in Period 1	Occupation in Period 2
Waiters	Packing, bottling and labeling machine operators
Shopkeepers	Hand packers
Shopkeepers	Packing, bottling and labeling machine operators
Butchers, fishmongers and related food preparers	Textile, fur and leather products machine operators not elsewhere classified
General office clerks	Paper products machine operators

**Table 5. Top 5 Downward Skill Mobility - Distances using Unweighted Sum of Components
[Ingram and Neumann 2006]**

Occupation in Period 1	Occupation in Period 2
Hand packers	Rice farmers
Hand packers	Building and related electricians
Paper products machine operators	Motor vehicle mechanics and repairers
Rubber products machine operators	Motor vehicle mechanics and repairers
Cement, stone and other mineral products machine operators	Electrical engineering technicians

Table 6. Top 5 Lateral Occupational Move using Unweighted Sum of Components [Ingram and Neumann 2006]

Occupation in Period 1	Occupation in Period 2
Traditional chiefs and heads of villages	Sales and marketing managers
Stock clerks	General office clerks
Professional services managers not elsewhere classified	Civil engineers
Business services and administration managers not elsewhere classified	Policy and planning managers
General office clerks	Stock clerks

**Table 7. Top 5 Upward Skill Mobility - Distances using Unweighted Sum of Components
[Gathmann and Schönberg 2010]**

Occupation in Period 1	Occupation in Period 2
Hand packers	Rice farmers
Paper products machine operators	Motor vehicle mechanics and repairers
Hand packers	Building and related electricians
Broadcasting and audio-visual technicians	Building caretakers
Rubber products machine operators	Motor vehicle mechanics and repairers

**Table 8. Top 5 Downward Skill Mobility - Distances using Unweighted Sum of Components
[Gathmann and Schönberg 2010]**

Occupation in Period 1	Occupation in Period 2
Waiters	Packing, bottling and labeling machine operators
Butchers, fishmongers and related food preparers	Textile, fur and leather products machine operators not elsewhere classified
Shopkeepers	Hand packers
Shopkeepers	Packing, bottling and labeling machine operators
Construction supervisors	Metal processing plant operators

Table 9. Top 5 Lateral Occupational Move using Unweighted Sum of Components [Gathmann and Schönberg 2010]

Occupation in Period 1	Occupation in Period 2
Contact centre information clerks	Filing and copying clerks
General office clerks	Applications programmers
Stock clerks	General office clerks
Financial analysts	Accounting and bookkeeping clerks
General office clerks	Stock clerks

Table 10. Top 5 Upward Skill Mobility - Distances using Unweighted Sum of Components [Autor and Handel 2013]

Occupation in Period 1	Occupation in Period 2
Teaching professionals not elsewhere classified	Cashiers and ticket clerks
Policy administration professionals	General office clerks
Teaching professionals not elsewhere classified	Motorcycle drivers
Sales and marketing managers	Garden and horticultural laborers
Legislators	Motor vehicle mechanics and repairers

Table 11. Top 5 Downward Skill Mobility - Distances using Unweighted Sum of Components [Autor and Handel 2013]

Occupation in Period 1	Occupation in Period 2
Cashiers and ticket clerks	Sales and marketing managers
General office clerks	Social work associate professionals
General office clerks	Policy and planning managers
Cashiers and ticket clerks	Teaching professionals not elsewhere classified
General office clerks	Policy and planning managers

Table 12. Top 5 Lateral Occupational Move using Unweighted Sum of Components [Autor and Handel 2013]

Occupation in Period 1	Occupation in Period 2
General office clerks	Paper products machine operators
Traditional chiefs and heads of villages	Sales and marketing managers
Service station attendants	Car, taxi and van drivers
Service station attendants	Welders and flame cutters
Stock clerks	General office clerks

Appendix 3.

Descriptive Statistics of the Overall Occupational Distance Measures: Using Direction Measure as a Weighted Sum of Components

Table 1. Top 5 Upward Skill Mobility - Distances using Weighted Sum of Components [Ingram and Neumann 2006]

Occupation in Period 1	Occupation in Period 2
Building construction laborers	Graphic and multimedia designers
Civil engineering laborers	Vocational education teachers
Motorcycle drivers	Visual artists
Domestic cleaners and helpers	Sales and marketing managers
Butchers, fishmongers and related food preparers	Aquaculture and fisheries production managers

Table 2. Top 5 Downward Skill Mobility - Distances using Weighted Sum of Components [Ingram and Neumann 2006]

Occupation in Period 1	Occupation in Period 2
Sales and marketing managers	Garden and horticultural laborers
Teaching professionals not elsewhere classified	Motorcycle drivers
Legislators	Motor vehicle mechanics and repairers
Shopkeepers	Hand packers
Shopkeepers	Packing, bottling and labeling machine operators

Table 3. Top 5 Lateral Occupational Move using Weighted Sum of Components [Ingram and Neumann 2006]

Occupation in Period 1	Occupation in Period 2
Traditional chiefs and heads of villages	Sales and marketing managers
Stock clerks	General office clerks
Professional services managers not elsewhere classified	Civil engineers
Business services and administration managers not elsewhere classified	Policy and planning managers
General office clerks	Stock clerks

Table 4. Top 5 Upward Skill Mobility - Distances using Weighted Sum of Components [Gathmann and Schönberg 2010]

Occupation in Period 1	Occupation in Period 2
Other cleaning workers	General office clerks
Hand launderers and pressers	Receptionists (general)
Fishery and aquaculture laborers	Production clerks
Civil engineering laborers	Vocational education teachers
Health care assistants	Early childhood educators

**Table 5. Top 5 Downward Skill Mobility - Distances using Weighted Sum of Components
[Gathmann and Schönberg 2010]**

Occupation in Period 1	Occupation in Period 2
General office clerks	Paper products machine operators
Shopkeepers	Hand packers
Shopkeepers	Packing, bottling and labeling machine operators
Sales and marketing managers	Garden and horticultural laborers
Cashiers and ticket clerks	Packing, bottling and labeling machine operators

Table 6. Top 5 Lateral Occupational Move using Weighted Sum of Components [Gathmann and Schönberg 2010]

Occupation in Period 1	Occupation in Period 2
Stock clerks	General office clerks
General office clerks	Stock clerks
General office clerks	Receptionists (general)
Typists and word processing operators	Data entry clerks
Secretaries (general)	General office clerks

Table 7. Top 5 Upward Skill Mobility - Distances using Weighted Sum of Components [Autor and Handel 2013]

Occupation in Period 1	Occupation in Period 2
Building construction laborers	Graphic and multimedia designers
Motorcycle drivers	Visual artists
Domestic cleaners and helpers	Sales and marketing managers
Civil engineering laborers	Vocational education teachers
Butchers, fishmongers and related food preparers	Aquaculture and fisheries production managers

**Table 8. Top 5 Downward Skill Mobility - Distances using Weighted Sum of Components
[Autor and Handel 2013]**

Occupation in Period 1	Occupation in Period 2
Teaching professionals not elsewhere classified	Motorcycle drivers
Sales and marketing managers	Garden and horticultural laborers
Legislators	Motor vehicle mechanics and repairers
University and higher education teachers	Electrical mechanics and fitters
Mechanical engineers	Motor vehicle mechanics and repairers

Table 9. Top 5 Lateral Occupational Move using Weighted Sum of Components [Autor and Handel 2013]

Occupation in Period 1	Occupation in Period 2
General office clerks	Paper products machine operators
Traditional chiefs and heads of villages	Sales and marketing managers
Service station attendants	Car, taxi and van drivers
Service station attendants	Welders and flame cutters
Stock clerks	General office clerks

