

# Awarding methods and their applicability across countries

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It has been suggested that many countries prefer to simply award contracts to the bidder with the lowest price in order to avoid corruptive activities. However, proposals providing enhanced characteristics at a slightly higher price are disregarded, leading to potentially lower quality and the neglect of best value for money. Therefore, other methods need to be taken into consideration to promote a development towards a more economically advantageous perspective. Consequently, this Bachelor Thesis is concerned with comparing and analyzing the awarding methods LP, WFS and AoV with regards to their applicability across countries.

The research method used is a combination of a literature review which is mainly concerned with procurement legislation, and a questionnaire study aimed at investigating attitudes of procurement officials from various countries on the subject of the applicability of the particular awarding methods.

Empirical research findings show negative attitudes concerning the transparency but also resistance to corruption of LP which supports the need for other methods to be put in place. WFS turned out to be the slightly more popular than AoV when it comes to the overall opinion of the respondents. Nevertheless, both MEAT-methods are considered better options than LP, providing more transparency, fairness and stimulating equal treatment.

Literature findings on (inter)national procurement law indicate that MEAT-methods in developing countries are in most cases only allowed under special procurement circumstances such as for instance purchasing consultancy services. In most of these particular cases WFS is promoted, whereas the monetary translation aspect AOV is concerned with can only be found in the procurement directive of the World Bank for procuring goods and equipment. However, since the World Bank is the basis for many national procurement directives of developing countries, it can be concluded that both methods can make chances on being able applied for different kinds of procurements.

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## **Keywords**

Awarding Methods, Corruption, Competitive Bidding, Weighted Factor Score, Awarding on Value, Public Procurement Legislation

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*3<sup>rd</sup> IBA Bachelor Thesis Conference*, July 3<sup>rd</sup>, 2014, Enschede, The Netherlands.

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# 1. INTRODUCTION

## 1.1 Problem indication

Procurement corruption is one of the most common and lucrative “white-collar crimes” in government machineries across the world. According to Auriol (2006), an ongoing Research of the World Bank estimates the total amount of bribery for public procurement to be 200 billion US Dollar each year, which translates to 3.5% of the world’s procurement spending. One of the most quoted definitions of corrupt behavior emphasizes “the abuse of public power or position for personal benefit” (Amanda, 1998, p.8). Relating particularly to procurement, the aspect of abusing contracting power can be highlighted (Pashev, 2011). Especially, in poor countries corruption in public purchase runs high and takes the extreme form of extortion (Auriol, 2006). Generally, public procurement corruption can be classified to include (1) supplier induced corruption as a result of stringent competition for government contracts, (2) public official induced corruption through creating bureaucratic hurdles that would necessitate seeking faster services, and it may also be (3) politically induced corruption where contractors with political connections receive favors for the fear of political prosecution “(Basheka, 2011). The corrupt official has some effective property rights over the government good he is allocating and unlawfully enriches himself or induces others to do so. This arises principal-agent problems (Shleifer & Vishny, 1993). Moreover, corruption greatly impacts the economy of every country by increasing the costs of transactions (Stamer, 2006). Relating to procurement, these costs can include the costs of searching for partners, determining contract conditions, and enforcing contractual terms (Lambsdorff, 2000). These costs are at the expense of the taxpayers and the consumers of public and utility goods and services (Shleifer & Vishny, 1993). In order to minimize principal-agent problems and remedy market failure, better monitoring actions and effective procurement legislation needs to be in place to ensure that rules concerning transparency and accountability are enforced (Pashev, 2011).

Many countries, especially developing ones, prefer to simply award a contract to the bidder with the lowest price (LP) which generally is an objective criteria on which decisions can be based on to avoid the possibility of corruption. However, proposals providing enhanced characteristics at a slightly higher price, are not taking into consideration when using the awarding on lowest price method. Potentially important evaluation factors such as technical merits, quality, experience, extent and length of guarantees, maintenance costs, after sale service and life-cycle costs, are being disregarded (Lorentziadis, 2010). Consequently, competitive bidding might prevent fraud to a large extent, however it is likely to neglect quality and not providing the best value for money. It has been suggested that purchasing management practices in developing economies are behind those in developed economies, amplifying the need to catch up (Msimangria, 2003). Consequently, other practices need to be made known there in order to promote a development towards a more economically advantageous perspective to find the best possible compromise between available resources and the quality of the required work or service. Many academics as well as practitioners have developed and made use of many different methods falling under the multi-criteria and MEAT perspective. (Sciancalepore, Falagario, Costantino & Pietroforte, 2011). However, the application of those kind of award mechanism is not widespread, because it is perceived as more complicated than the traditional lowest price award mechanism, what could lead to resistance (Dreschler, 2009).

## 1.2 Research Question

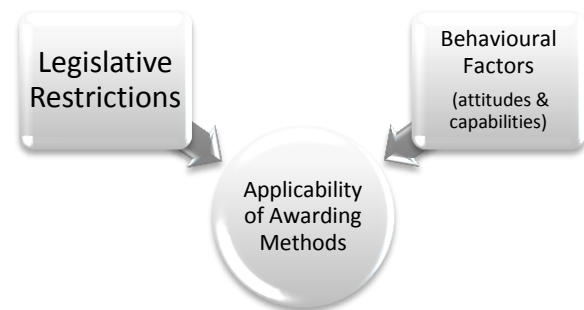
This research paper is aimed at investigating perceptions and attitudes on various methods for the awarding phase in the tendering process in order to find out the extent of their applicability in various countries.

The focus will hereby lay on comparing Awarding on Value with two MEAT methods, namely Weighted Factor Score (WFS) and Awarding on Value (AoV). The first is a well-known and widely used method (De Boer, Linthorst, Schotanus & Telgen, 2006), whereas the latter has just recently started to gain rapid acceptance among local governments and governmental agencies in the Netherlands. CROW (2007), state that it is especially a lack of public knowledge about the method causing for it not to be used elsewhere, yet.

The following research question is investigated:

*“To what extent are the awarding methods LP, WFS and AoV applicable in various countries?”*

The extent of applicability will firstly be depended on legal restrictions, and secondly behavioral factors such as attitudes and also purchasing capabilities.



**Graph 1. Requirements influencing the applicability of awarding methods**

The various countries of interest are grouped into 4 categories in order to be able to draw comprehensive comparisons: (1) The Netherlands, (2) Other Developed Countries, (3) African Developing Countries and (4) Other Developing Countries.

In context with the research question, several sub-questions occur:

1. *What is Awarding on Lowest Price, Weighted Factor Score and Awarding on Value and how are they applied?*
2. *What are requirements concerning the applicability of the three Awarding Methods*
3. *Are there cross-national differences concerning these requirements?*
4. *What are perceived attitudes towards the awarding methods and their compliance to anti-corruption principles?*
5. *Are there cross-national differences concerning these attitudes?*

I attempt to answer the research questions by combining literature with empirical research. Further explanation will be given at the methodology sections.

## 1.3 Academic and managerial relevance

The academic relevance is given due to the fact that generally, little academic research has been focusing on comparing the particular awarding methods, especially not AoV (Sciancalepore & Telgen, 2011). However, it gains more and more acceptance what leads to the need to give it more attention

academically. This is especially notable from an international perspective, as there has to my best knowledge, so far not been any other research focusing on investigating possibilities of applying AoV in countries outside its country of origin. This research paper addresses this gap and delivers new insights and contributing to the expansion of the existing scientific knowledge. The results delivered by this research can help managers and practitioners to explore alternative awarding methods which their organization could potentially benefit from.

### 1.4 Structure

The remainder of this research is structured as follows. To start out with, the three Awarding Methods of interest will be explained. This is followed by a descriptive literature review, including a methodology part and a discussion of requirements. Subsequently, the empirical research will be explained methodology-wise, the results on attitudes will be presented and analyzed. Results of both the literature and the empirical research will be elaborated on in the discussion part. Furthermore a comprehensive conclusion will be drawn. Lastly, there will be a reflection on the limitations of this research, as well as some suggestions for further research, followed by some acknowledgments.

## 2. AWARDING METHODS

### 2.1 Awarding on Lowest Price

LP is a common method which is also known as competitive bidding. Competitive bidding aims at obtaining goods and services at the lowest price by stimulating competition and preventing favoritism at the same time. Government agencies are often required by law to solicit competitive bids as this reduces the opportunity for corrupt practices (Holt, 1980). However, other possibly important evaluation factors such as technical merits, quality, experience, extent and length of guarantees, maintenance costs, after sale service and life-cycle costs, are being disregarded what could potentially lead to neglecting quality and not providing the best value for money, as well as the risk of leaving other suppliers that offer the lowest prices in the risk of bankruptcy (Lorentziadis, 2010, Gunduz & Karacan, 2008). Therefore, other awarding methods should be taken into consideration as well. Examples of those will be discussed in the following sections.

### 2.2 Most Economically Advantageous Tender

MEAT methods fall under the multiple award criteria, known in Public Procurement as the “Most Advantageous Tender” (MEAT). It considers non-price factors together with price when evaluating proposals. All evaluating factors are required to be made public in advance of each tendering process (Lorentziadis, 2010). These methods offer an alternative to competitive bidding which often is offset by high costs of maintenance, consumables, technical support and other operation costs (Pashev, 2011).

In the following section, two methods which fall under this category will be discussed.

#### 2.2.1 Weighted Factor Score

WFS is a well-known and widely used method (De Boer, Linthorst, Schotanus & Telgen, 2006). Telgen and Schotanus (2010) highlight the need for full transparency and disclosure of

all details regarding weights and awarding schemes since this does not only lead to the avoidance of subjectivity in supplier selection but also to receiving better bids.

#### 2.2.1.1 A-step-by-step description

- Step 1: Firstly, all relevant criteria are determined.
- Step 2: Weights are assigned to each criteria according to importance.
- Step 3: All suppliers are awarded scores on all criteria.
- Step 4: The scores are multiplied (weighted) with the respective weights of the corresponding criteria.
- Step 5: For each supplier  $i$ , all scores are added and the total score is defined as  $WFS_i$ .
- Step 6: The supplier with the highest total score is awarded the contract.

#### 2.2.1.2 An application example of WFS

The weights for criteria and quality were set to be as follows:

Criteria	Price	Quality
Weight	0.4	0.6

There are three bids for this tender. For each bid quality as well as price scores are determined.

Supplier	Price	Quality
A	8	4
B	6	6
C	4	8

Subsequently, the scores are multiplied with their respective weights, leading to the result that supplier C is awarded the tender.

Supplier	Price	Price Point	Quality	Quality Points	Total WFS
A	$8 * 0.4$	3.2	$4 * 0.6$	2.4	5.6
B	$6 * 0.4$	2.4	$6 * 0.6$	3.6	6
C	$4 * 0.4$	1.6	$8 * 0.6$	4.8	6.4

### 2.2.2 Awarding on Value

AoV is a method for determining the best supplier bid with the means of a price correction mechanism (Sciancalepore & Telgen, 2011). It was developed to fight corruption in the Dutch construction industry and to promote innovation (CROW, 2007).

#### 2.2.2.1 A step-by-step description

AoV takes into consideration both the commercial and the technical proposal of a bid. The commercial part is evaluated as the bid price by the  $i$ -th bidder  $P_i$ . With regards to the technical part of the proposal, the scope of the method is to determine the technical value of the bid concerning the quality criteria. Basically, the method addresses the assessment of the qualitative features of the bids from a monetary perspective: for each criterion (e.g. product quality, process quality, delivery time, past experience, sustainability), the impact in terms of added value is established. Then the bid price is corrected by subtracting the total added value of the bid (Sciancalepore & Telgen, 2011).

- Step 1: Decide on your technical quality criteria and make those publicly known to all parties involved.
- Step 2: Define the value of the minimum required quality  $Q_{min}$  and the maximum possible quality  $Q_{max}$ .

- Step 3: Determine the technical quality score  $Q_i$ .
- Step 4: Calculate the technical quality  $q_i$  by filling in all the information of the steps before in the following formula:  $q_i = \frac{Q_i - Q_{min}}{Q_{max} - Q_{min}}$
- Step 5: Consider how much you are willing to pay in order to move from the minimum required quality to the maximum possible quality, or in other words, the added value. This parameter is set as the Delta Value  $V$ , and represents the highest added value considered possible for tenders.
- Step 6: Determine the technical values of all criteria  $V_{qi}$  what basically is the translation of scores into monetary terms. This is done by multiplying the Delta Value with the technical quality  $q_i$ .
- Step 7: Sum up all the technical values of all criteria.  $\sum_i V_j q_{ij}$
- Step 8: Do the price correction by subtracting the technical values from the commercial bid price. It is not before this step that the bid price is taken into consideration and made known to the evaluators.  
 $CP_i = P_i - \sum_i V_j q_{ij}$
- Step 9: Award the contract to the bidder with the lowest corrected price.

### 2.2.2.2 An application example of AoV

Table 1 shows a case where AoV is applied. There are three bids for this tender. The minimum acceptable technical score is  $Q_{min} = 60$  (on a maximum technical score of  $Q_{max} = 100$ ). The Delta Value has been set to  $V = €100.000$ .

**Table 1. Example of applying Awarding on Value**

	Commercial Proposal	Technical Proposal				
		Step 3	Step 4	Step 6	Step 8	Step 9
Bid #	Price P (\$)	Technical quality score Q	Technical quality $q_i$	Technical Value $Vq_i$ (\$)	Corrected price $CP_i$ (\$)	Rank
1	150,000	80	0.50	50,000	100,000	1
2	200,000	96	0.90	90,000	110,000	2
3	120,000	62	0.05	5,000	115,000	3

Bidder 1 will be awarded the tender as he offers the best corrected price.

## 3. LITERATURE REVIEW METHODOLOGY

This research mainly aims at investigating the extent to which it is possible to apply the awarding methods in different countries worldwide. In order to do so, there needs to be some elaboration on the scope of the extent. Therefore, factors and requirements need to be identified that have an influence due to being a hindrance or facilitator.

In order to support answering the sub-research questions (2) *What are requirements concerning the applicability of the three Awarding Methods* and (3) *Are there cross-national differences concerning these requirements?*, a descriptive literature review is conducted in order to gather and discuss evidence of other researchers. This implies that the main sources of the literature

review are from secondary sources such as scientific articles published in academic journals. Legal documents will be accessed through the websites of the specific country or institutions of interest or google search.

Google Scholar will be used as database to find papers of interest since it offers the broadest spectrum of hits when searching for key words compared to other databases.

The following key words will be used independently and also in various combinations:

Corruption, Fraud, Procurement, Public Procurement, Purchasing, Awarding on Value, Weighted Factor Score, Award Methods, Developing Countries, Most Advantageous Tender (MEAT), Lowest Price, (International) Competitive Bidding, Procurement Legislation/Directives, Awarding Process, World Bank, United Nations, European Union, Procurement Capabilities, Value, Public Procurement, Tenders, Developing Countries, Africa, Australia, the Netherlands, Uganda, Ethiopia, Bangladesh.

Moreover, the reference lists of articles found will be scanned in order to find other related and potentially interesting ones.

Articles are sorted by scanning, firstly the titles and then reading the abstracts of the ones that appear interesting and relevant.

Results of the literature review will be used to framework the empirical research.

## 4. PUBLIC PROCUREMENT LEGISLATION

Good law as well as its effective enforcement is necessary in order to curb corruption and promote a fair procurement process. However, this is very much depended on the capacity of the judiciary and administration (Pashev, 2011). Corruption can arise because bad policies or inefficient institutions are put in place to collect bribe from individuals seeking to get around them (Djankov, LaPorta, Lopez-de-Silanes & Shleifer, 2003).

In most developed countries, public procurement takes place within a framework of international obligations, such as the World Trade Organisation's Agreement on Government Procurement or the Procurement Directives made under regional agreements such as the European Union or the North America Free Trade Agreement. (Agaba & Shipman, 2006).

Such international rules apply to tenders for large public purchases whose monetary value exceeds a certain threshold making them of cross-border interest. For tenders of lower value, national legislation apply, however, it is advisable to still be in respect to general principles (Auriol, 2005).

It is suggested that public procurement in most developing countries does not necessarily has to meet international principles (Agaba & Shipman, 2006). This can lead to systems that are characterized by a number of complex, restrictive regulations coupled with inadequate controls offering a fertile ground for corruption (Basheka, 2011). A study of Wittig (1999) indicates that in several African states, the legal frameworks are unclear and may not be comprehensive enough to effectively manage the system. And even if they are in place, the effect of implementation can be questionable. This is due to the fact that in many developing countries, public procurement has not been viewed as having a strategic impact on the overall management of public resources. Therefore, little effort was done to ensure that the policies and the institutional frameworks were used in the most efficient way and that the systems delivered the best value for money. However, many developing countries have realized the need for a well-organized and

functioning public procurement system in order to increase confidence that public funds are well spent what has led to a great reformation of public procurement legislation and systems (Hunja, 2003).

The following section will discuss international as well national public procurement directives in regards to whether the awarding methods can be applied under the eyes of law.

## 4.1 United Nations

### 4.1.1 Procurement Principles

The United Nations Procurement Manual states that the procurement process needs to be fair, objective and transparent. In order to ensure that this is given, the selection process also takes into consideration a balancing of the following principles: (a) best value for money, (b) integrity; the legal framework should promote integrity between the procurement function, transparency in delivering government policy and value for money, (c) effective international competition and (d) the interest of the United Nation (United Nation, 2013).

### 4.1.2 Supported Methods

According to the financial rule 105.14 of the UN nations's procurement manual, contracts shall be awarded on the basis of effective competition. The competitive process shall include formal methods of solicitations such as Invitation to Bid (ITB) or a Request for Proposal (RFP) or direct solicitations, as well as informal evaluation which such as Request for Quotation (RFQ) which is done by an evaluation committee. Moreover, the financial regulation 5.12 establishes Best Value for Money (BVM) as one of the general rules when procuring goods, services or works. BVM is applicable throughout the entire acquisition process. It is defined as the "optimization of whole-life costs and quality needed to meet the user's requirements while taking into consideration potential risk factors and resources available (United Nations, 2013, Chapter 1)." Consequently, *price alone is not necessarily determinative of Best Value for Money, other non-cost related criteria need to be considered as well leading to determination of the bid or proposal with the maximum benefit for the organization.* Generally, there are three types of criteria that is used to assess submitted bids: (1) Commercial criteria (face values, total cost of ownership, financial status and capability of the vendor, TBD non-financial costs and limitations or exceptions of the UN General Conditions on contracts), (2) Technical criteria (the vendor's understanding of UN requirements, the vendor's past performance), (3) Management criteria (experience, commitment to quality, management methods and systems, personnel qualifications, labor & equipment resources, facilities and finances). *Technical and management criteria should already be developed as part of the specifications. The technical evaluation of Bids shall not be based on scoring, but rather on a pass/fail determination.* Consequently, when applying ITB, the lowest acceptable price is awarded the contract, whereas RFP appreciates the technical evaluation first, and after that into account the financial aspect. In contrast, for RFP the award is recommended to the proposal with the highest weighted scores from both technical and financial evaluation. Relating to the facts just mentioned as well as the UN's desire to conduct Best Value Procurement, I conclude that it is possible to award on other aspects than lowest price only. Moreover, no monetary aspects concerning evaluating the bids in regards to monetary terms have been found which leading to the assumption that AoV is not necessarily an option that is directly supported by the UN legislative. WFS, on the other

hand is an awarding method which is well applicable, especially in relation with RFP.

## 4.2 European Union

### 4.2.1 Procurement Principles

In reference to the Treaty on the Functioning of the European Union (TFEU) the following key principles apply to all aspects of the procurement process: "(a) Transparency; this is not simply about disclosure and openness but also the removal of discretion and subjectivity. Evaluation must be based on objective criteria that are known to bidders in advance, (b) Fairness; evaluation criteria and the evidence required from bidders must be actually and demonstrably related to the subject matter of the contract and applied proportionately to the stated objectives, and (c) Equal treatment (or non-discrimination); all bidders and potential bidders must be given the same opportunity, based on the same information and criteria, and evaluated in a non-discriminatory manner (Thomas Reuters, 2014, p.1)

### 4.2.2 Supported Methods

In the European Union, the public procurement processes are relatively strict regulated by the Directives, 2004/17/EC and 2004/18/EC. The aim of the directives is to ensure a competitive bidding process by establishing common rules for advertising procurement needs, inviting tenders and contract awarding (Parikka-Alhola, Nissinen & Ekroos, 2007).

According to article 53 of the EU procurement directive (EU, 2004, p.148; Lorentziadis, 2010), *awarding public contracts can either be done by lowest price or Economically Most Advantageous tender (MEAT).* The latter also takes next to price also quality, technical merit, aesthetic, functional characteristics, environmental characteristics, running costs, cost-effectiveness, after-sales service, technical assistance, delivery date and period of completion into consideration. The relative weighting of each criteria shall be specified and be made available to all suppliers submitting a bid. Abnormally low tenders can be rejected.

No clear specifications are noted concerning the translation of the quality criteria which leads to the assumption that there are no clear instructions on this matter and the conclusion that both WFS and AoV can be possible awarding methods next to lowest price.

## 4.3 World Bank

### 4.3.1 Procurement Principles

The World Bank believes that increasing the efficiency, fairness, and transparency of the expenditure of public resources to be critical to sustainable development and the reduction of poverty. Consequently, the procurement principles of the world bank are (a) economy; the law should enable public procurement to be accomplished professionally in a reasonable time, (b) efficiency; the legal framework should ensure value for money is achieved; (c) transparency, and (d) fair competition (OP 11.00 Procurement, 2013).

### 4.3.2 Supported Methods

According to the World Bank (2014) open competition is the basis for efficient public procurement. In reference to this, borrowers shall select the most appropriate method for their specific procurement case. However, in most cases the Bank requires its Borrowers to obtain goods, works, and non-consulting services through International Competitive Bidding (ICB) open to eligible suppliers, service providers, and

contractors. The objective of International Competitive Bidding (ICB), as described in is to provide all eligible prospective bidders with timely and adequate notification of a borrower's requirements and an equal opportunity to bid for the required goods, works, and non-consulting services. Consequently, *the supplier with the lowest offered bid is in most cases likely to get awarded the contract*. However, for goods and equipment, other factors may be taken into consideration, including, among others, payment schedule, delivery time, operating costs, efficiency and compatibility of the equipment, availability of service and spare parts, and related training, safety, and environmental benefits. *The factors other than price to be used for determining the lowest evaluated bid shall be, to the extent practicable, expressed in monetary terms in the evaluation provisions in the bidding documents* (World Bank, 2014, 2.52). Exceptionally, relative weight may be given when specifications cannot be precisely defined or factors other than price cannot always be expressed in monetary terms such as may occur for the procurement of complex information technology and textbooks. Considering the fact that other criteria than price is supposed to be translated in monetary terms, it can be concluded that AoV which expresses the added value in monetary terms is an option in those exceptional cases.

Concluding, awarding on lowest price as international competitive bidding as well as AoV are methods that are legally supported by the World Bank's procurement directive. There was no evidence that WFS can be applied under the World Bank's legislation.

## 4.4 The Netherlands

### 4.4.1 Procurement Principles

The Dutch government has just recently introduced a single framework for all contracting authorities and for all public contracts with or without cross-border interests (van de Meent & Manunza, 2013). The Public Procurement Act 2012 provides a general legal framework for public procurement regulations and implements the European public procurement Directives as well as its principles (Thomas Reuter, 2013).

### 4.4.2 Supported Methods

Relating to the content of the paragraph on the EU legislation above and given the fact that the Dutch case mostly falls under EU law we can conclude also here all three methods can be applied in terms of legal circumstances. This is of course supported by the knowledge that AoV has been developed and already been used here for the past years.

## 4.5 Other Developed Countries: Australia

### 4.5.1 Procurement Principles

In relation to public procurement, the Australian government has made a stipulatory effort to engage in transparent procurement processes and to maintain a strong focus on achieving value for money. The Australian Government is eagerly committed to ensuring accountability and transparency in its procurement activities. This is achieved through appropriate and transparent reporting of procurement activity, and the use of confidentiality provisions in contracts only where justified.

### 4.5.2 Supported Methods

The 2012 Commonwealth Procurement Rules (CPRs) represents the Government Policy Framework under which agencies undertake and govern their own procurement and combine both Australia's obligations and good practice. *The*

*price of goods and services is not considered to be the sole determining factor when assessing value for money*. Instead a comparative analysis of the relevant financial and non-financial costs and benefits of alternative solutions throughout the procurement will determine the value assessment taking into account fitness for purpose, a potential supplier's experience and performance history, flexibility, environmental sustainability, as well as whole-life costs. (The Australian Government – Financial Department, 2012). Hence, the Australian government will award contracts to the suppliers that provide the best value for money, in accordance with the essential requirements and evaluation criteria specified in the request documentation. The procurement rules are not very comprehensive when it comes to awarding methods. However, it is mentioned that non-price evaluation criteria may be weighted or a combination of weighted and non-weighted criteria and that each criterion should be scored using a point system (Australian Government - Department of Foreign Affairs, 2012).

This information can be used to assume that WFS is a potential option to be used under the Commonwealth procurement law. There is no direct evidence that AoV could be applied when awarding contracts due the lacking piece of information that monetary translations are allowed as well next to scoring systems.

## 4.6 African Developing Countries: Ethiopia

### 4.6.1 Procurement Principles

Generally, the Ethiopian public procurement law itself is still at a rather infant stage. For the longest time there has not been any comprehensive procurement law at a national level. In 2005, the federal government finally introduced a law with a detailed procedure of public procurement, also establishing a federal agency empowered to regulate the procurement of works, goods and services. In 2009, four years after the issuance, the law was revised and replaced by the Ethiopian Federal Government Procurement and Property administration Proclamation No.649/2009 which includes more detailed and clear procedures as well as a wider scope. The regulatory framework tries to embrace some of the internationally accepted principles by trying to (1) achieve the maximization of value for money by insuring economy, efficiency and effectiveness, (2) highlight non-discrimination, (3) ensure that decision making is transparent to all concerned parties, (4) ensure accountability and (5) encourage & support local producers and companies. Overall, efforts have been made to make the law clear, flexible and comprehensive. However, it comes with some issues. When for instance looking at article 3(2b) public bodies are not subject to procurement procedures if they intend to participate in the provision of goods, works, consultancy or any other services. Consequently, they will always get awarded the contract without having to compete with the private sector at all which basically destroys the principle of fairness and non-discrimination. In addition, there is not even an alternative procedure in place ensuring transparency and accountability when the competition is between two public bodies (Abraham Law Office, 2012; Ethiopian Ministry of Finance and Economic Development, 2010). Consequently, there are still some improvements to be made in the future.

### 4.6.2 Supported Methods

Ethiopian public procurement is either subject of International Competitive Bidding according to the laws of the World Bank, or it falls under own national law, depending on whether tenders fall below or above certain thresholds (Ethiopian

Ministry of Finance and Economic Development, 2010, p.8). The Ethiopian legislative considers open bidding which leads to awarding on lowest price, to be the preferred method of choice. However, some other methods are allowed under certain circumstances. When procuring consultancy services a request for proposal can be made. In this case, the bid evaluation can be based for instance on the least costs, quality only or a combination of cost and quality factors. The latter can include experience (5-10%), the method applied in doing the study or research (20-50%), the ability to transfer knowledge (5-10%), the competence of key professionals (30-60%) and the participation of Ethiopians (5-10%). All criteria are weighted up and added to find the overall winner when looking at the combined total scores of price (20%) and quality (80%) what basically confirms the possibility of using the WFS method in Ethiopia, at last for consultancy procurement. No indications for AoV can be found in the Ethiopian procurement directive.

## 4.7 Other developing Countries: Bangladesh

### 4.7.1 Procurement Principles

Public procurement contracts have been a major source of corruptive activities in Bangladesh's administrative body. Therefore, the country's recent procurement legislative, the

Public Procurement Act of 2008, has sought to ensure accountability and transparency in the procurement of public goods, works and services using public funds, as well equal treatment and a free and fair competition amongst all persons wishing to participate in the procurement process (Hoque, 2010).

### 4.7.2 Supported Methods

Concerning the domestic procurement of goods, related services, and works, the preferred method prescribed is the open tendering method, implying the LP method. However, alternative procurement methods alternative are also available when procuring intellectual and professional services. When it comes to procuring consultancy services, quality of the proposal as well as cost of the services are taken into consideration, and the qualifications of the consultant. This process is very similar to the one described in the Ethiopian law, also being based on a weighted scoring system (Government of the People's Republic of Bangladesh, 2008, Chapter 6).

Therefore, also in the case of Bangladesh, procurement officials can generally make use of the lowest price method and in particular when consultancy services are needed also of WFS.

**Table 2. Principles of Legislative Frameworks**

Institution	United Nations	EU	World bank	The Netherlands	Australia	Ethiopia	Bangladesh
<b>Procurement Method</b>	Best Value	Lowest Price; MEAT	Mainly Int. competitive bidding	EU regulations	Value for Money	Mainly (int.) competitive bidding	Mainly (int.) competitive bidding
<b>Awarding Methods</b>	LP WFS	LP WFS AoV	LP AoV	LP WFS AoV	LP WFS	LP WFS	LP WFS
<b>Principles</b>	Transparency Fairness Objectiveness Integrity	Transparency Fairness Equal (non-discriminatory) Treatment	Transparency Fair competition Economy Efficiency	Transparency Fairness Equal (non-discriminatory) Treatment	Transparency Fair Accountability Efficiency Effectiveness	Transparency Non-discrimination Economy Efficiency Effectiveness	Transparency Fair Competition Accountability Equal Treatment

Summing it up, there are several internationally accepted basic principles which are mentioned to some extent in all of the legislative directives mentioned: transparency, fairness and non-discrimination (equal treatment). These three principles will be further used in this research as a pillar for asking question concerning the perceptions on corruption in relation to the three awarding method.

## 5. PURCHASING CAPABILITIES

Admittedly, MEAT methods are more complex requiring better skills and knowledge from purchasing personnel compared to competitive bidding. However, Whitehead (2006) finds that properly trained people are still lacking in many organizations. Guinipero and Percy (2000) add that the adoption of a comprehensive skill set has become crucial to the purchasing profession since it evolves from a rather clerical towards a more tactical and strategic function becoming more and more

complex. The authors suggest seven skill areas a good purchaser should possess: (1) strategic skills, (2) process management skills, (3) team skills, (4) decision-making skills, (5) behavioral skills, (6) negotiation skills and (7) quantitative skills. However, especially procurement professionals from developing countries lack those greatly. Wittig (1999) finds that quite some African states do not require particular professional skills from their purchasing officials. According to his research there is no need for any university education in the field of purchasing or supply management. Some familiarity with procurement rules and procedures are not always the standard and on the job training is quite common. Also, a study of Tumutegereize (2013) shows that in the case of Uganda, in 2003 there were less than 50 qualified procurement professionals, most of them holding certificates from outside the country. Both researches show the urgent need to develop professionals within the developing countries themselves. The Ugandan government for instance took several steps in order to

promote this development by introducing two university programs to educate and train procurement officers but also other stakeholders both professionally and academically. Standards and competence levels were set to grow professionalism. However, it is still questionable if developing countries have the proper purchasing capabilities to implement complex awarding methods.

## 6. EMPIRICAL RESEARCH METHODOLOGY

In order to find an answer to the research question ‘To which extent are the different awarding methods applicable in various countries?’ a survey will be used to assist literature findings.

The results of the questionnaire will help answering the sub-research questions (3) *What are perceived attitudes towards the awarding methods and their compliance to anti-corruption principles?* and (4) *Are there cross-national differences concerning these attitudes?*

### 6.1 Data collection method

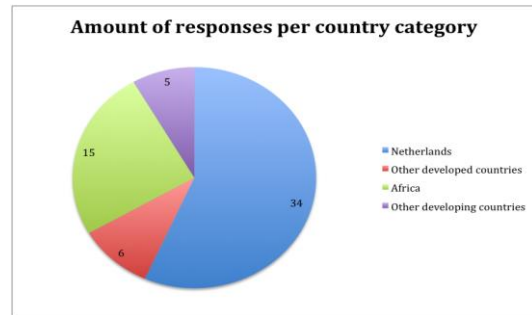
The empirical part of this research took place in the form of a questionnaire study, which was created via Google Questionnaire and distributed via various channels such as personal email, professional websites and social media platforms groups focussing on procurement. Surveys are widely used to directly and flexibly collect information from a unit of analysis (Leung, 2001). Moreover, surveys are excellent vehicles for measuring attitudes and orientations (Babbie, 2010). It was chosen to do a self-administered survey in order to protect the participants’ confidentiality and give them the possibility to respond at their convenience.

### 6.2 Pilot Survey

Before sending out the questionnaire to the actual participants, it must be pretested in form of a pretest (Salant & Dillman, 1994). This pilot represents a small sample of people characteristic of those in the survey (Leung, 2001). 13 purchasers from all across the world were asked to fill in the pilot survey and consequently make suggestions for improvement. Respondents advised to shorten the questionnaire, however there was no criticism on its content or understandability.

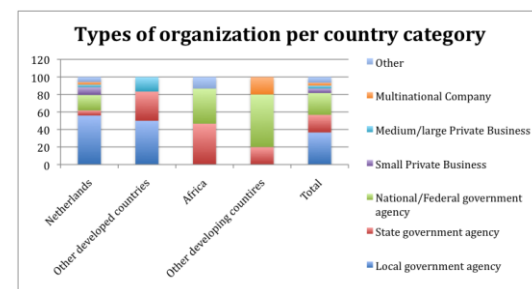
### 6.3 Participant sample

The questionnaire was sent to purchasing representatives involved in procurement activities worldwide. In total we received responses of 60 purchasers from various countries, including the Netherlands, Australia, United States, United Kingdom, Ghana, Mauritius, Ethiopia, Rwanda, Uganda, Yemen, Philippines, Colombia and Bangladesh. Due to the limited number of respondents for some countries we divided the countries into country categories, namely the Netherlands, Other developed countries (United States, United Kingdom, Australia), Africa (Ghana, Mauritius, Ethiopia, Rwanda, Uganda) and Other developing countries (Yemen, the Philippines, Colombia, Bangladesh).



Graph 2. Amount of responses per country category

Around 80% of all respondents in every country category are employed at public institutions. Concerning the developed countries the greatest amount of responses was received from local government agents while as in developing countries especially state and federal institutions were counted.



Graph 3. Types of organization per country category

For additional information on the sample, e.g. level of education, experience, industry and main activity per country category see appendix B.

### 6.4 Questionnaire Description

The questionnaire firstly covered some basic information questions concerning the country of residence, education, organization and main purchasing activities. Subsequently, the three awarding methods were explained, followed by a discussion part. For each method the same set of questions was asked investigating whether the respondents understand, are familiar with, have used and like the particular methods. Also, they were asked whether they believe that they could be applicable within their countries of residence. In order to inquire whether the respondents perceive the methods to be in line with the international anti-corruption principles, they were requested to rate each method on a scale from one to five regarding transparency, fairness, the stimulation of equal treatment as well as the resistance to corruptive behaviour. Furthermore, in the specific case of AoV, participants were invited to rate whether they think that the method could potentially be applied within their organization, their country and on a global basis. This was followed by an assessment of problems that possibly preventing the application. This last question consisted of multiple choice options which included a combination of the problems recognized by CROW (2007) and (Sciancalepore & Telgen, 2011): legal restrictions, lack of education, bad loser behaviour, additional costs, resistance to change, too many tools, scoring of the bids and determining the Delta value.

When creating the questionnaire the following hypotheses were assumed: (see Bussink, 2014 for more in depth explanation of the argumentation)



The first hypothesis arose from the literature study on purchasing capabilities assuming that latter are too a great extent lacking in especially developing countries:

*H1: AoV and WFS are understood by fewer purchasers, especially in developing countries.*

Sciancalepore & Telgen (2011) present AoV as a new awarding method that was developing in the Dutch and has been getting more and more popular there during the past year. CROW (2007), assumes that it the method is only known there. In order to investigate whether it is really the case that it is not known elsewhere hypthoses 2 and 3 propose:

*H2: AoV is only known within the Dutch procurement community.*

*H3: AoV has only been used within the Dutch procurement community.*

Based on the statement of Lorentziadis (2010) saying that LP does in most cases not provide the best value for money by leaving out bids by suppliers that might score higher on other criteria than price, hypothesis 4 and 8 are created:

*H4: LP is a less liked awarding method than AoV and WFS.*

*H8: Of all three methods, LP is considered to be the one that stimulates equal treatment the least.*

The following statement is based on findings of the literature study on legal restrictions and lacking purchasing capabilities, particularly in developing countries:

*H5: AoV is considered to be perceived more difficult to implement in developing countries than in developing countries.*

Hypothesis 6 and 9 are interrelated and grounded on the in the purchasing community generally admitted fact that LP is used in most developing as a mean to prevent corruption to the best extent possible by providing transparent processes and criteria:

*H6: LP is considered to be more transparent than AoV and WFS.*

*H9: LP is considered to be more resistant to corruptive behavior than AoV and WFS.*

CROW (2007) state that AoV is supposed to be method that is resistant against fraud while at the same time being fair. Based on this, hypothesis 7 assumes:

*H7: AoV is considered to be considered to be the fairest awarding method throughout all country categories.*

Hypothesis 10 is aimed at investigating whether the purchasers believe that to their best knowledge AoV could be applicable in their own country of residence as well as in others:

*H10: AoV is applicable in both developed and developing countries.*

Hypothesis 11 is such as 5 based on literature findings suggesting that there purchasers in developing countries lack skills and proper education.

*H11: A lack of education is considered to be the main issue considering implementing AoV other than lowest price.*

## 6.5 Data Analysis

All collected data stored at Google Questionnaire were translated into a SPSS spreadsheet and turned into variables, which in the following step were analysed by creating

descriptive output using the functions of SPSS and Excel. Cross tables and graphs were made in order to be able to elaborate the discussion of the results of the survey. To test the significance of the differences in attitudes towards the awarding methods two-proportion z-tests were used. To test the significance of differences between means t-tests for two means were conducted.

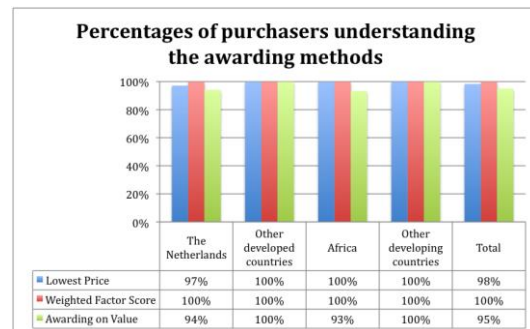
## 7. EMPIRICAL RESULTS

### 7.1 Purchasing capabilities & attitudes

The first part of the questionnaire was meant to investigate the purchasers' personal procurement capabilities, their knowledge on procurement methods as well as their opinion on them.

#### 7.1.1 Understanding

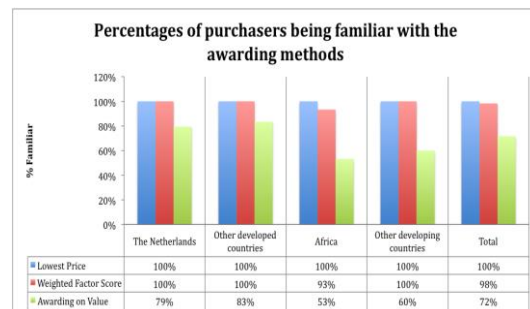
Generally, it can be said that the great majority of all respondents claims to understand all three methods. A two proportion z-test with a  $p=0.95$  (P-value is smaller than  $P=1-\alpha=0.95$  (for  $\alpha=0.05$ )) confirms that there is no significant difference in the level of understanding between the Dutch and the African groups. Nevertheless, looking at the graph AoV can be concluded to be the method that slightly fewer purchasers understand compared to the others.



Graph 4. Understanding of awarding methods

#### 7.1.2 Familiarity

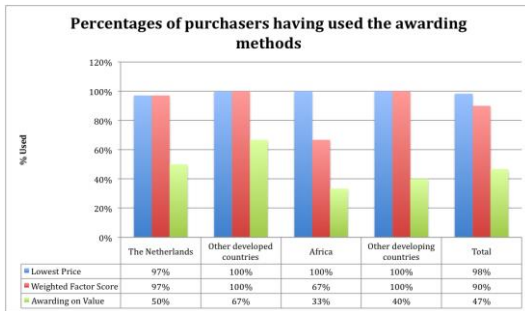
All the respondents were familiar with Lowest Price. WFS is also known by almost everyone which can be seen at the total global score of 98%. The awarding method respondents were the least familiar with is AoV with a total percentage of 72%. It can be observed that Purchasers in developed countries seem to be more familiar with it than those in developing countries. A two proportion z-test with a  $p=0.9686$  (P-value is larger than  $P=1-\alpha=0.95$  (for  $\alpha=0.05$ )) confirms that there is a significant difference in the level of familiarity when comparing the Dutch and the African purchasers.



Graph 5. Familiarity with awarding methods

### 7.1.3 Used

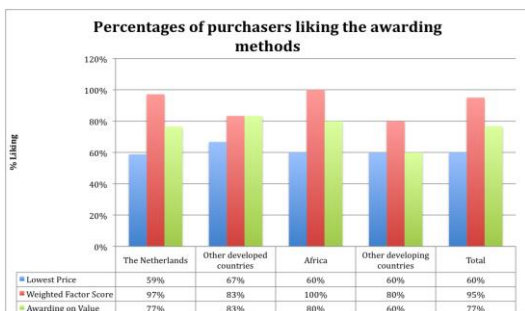
Lowest price has been used by 98% of all respondents. Most participants have used WFS, except of African purchasers were only 67% have already been in contact with the method compared to a total score of 90%. AoV turns out to be the least used method with an average total of 47%. Differences can be noticed between developed countries where the usage rate is between 50% and 67% compared to the developing countries where it is only between 33% and 40%. However, a two proportion z-test investigating the differences in usage of AoV between the Netherlands and Africa cannot confirm a deviation that is significant though ( $P=0.8599$ ; P-value is smaller than  $P=1-\alpha=0.95$  (for  $\alpha=0.05$ )).



Graph 6. Used Awarding methods

### 7.1.4 Like

Lowest price is the least liked method with only 60% of the total respondents. A two proportion z-test was conducted to investigate whether there are differences between purchasers from Developing and from Developed countries concerning liking lowest price. However, it was found that there is no significant difference ( $P=0.5$ ; P-value is smaller than  $P=1-\alpha=0.95$  (for  $\alpha=0.05$ )). WFS is the most liked method with percentages ranging from 80% in other developing countries to 100% in African developing countries. The popularity of AoV ranges between 60% in other developing countries to 83% in other developed countries.

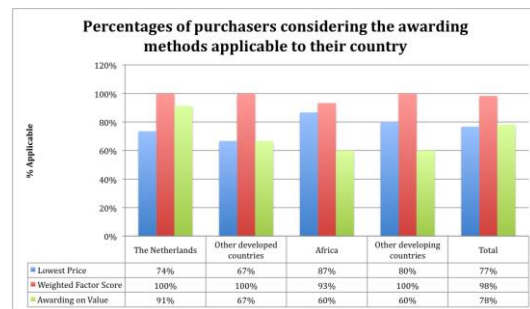


Graph 7. Liking Awarding methods

### 7.1.5 Applicability

The results concerning the applicability are pretty much the same as the ones for liking the methods. WFS is considered to be the best applicable method with a total score of 98%. AoV turned out to be the best applicable in the Netherlands with 91% and the least applicable in both developing countries categories with only 60%. The significance of this finding was analysed via a two proportion z-test. The p-value turned out to be  $P=0.9956$  (P-value is larger than  $P=1-\alpha=0.95$  (for  $\alpha=0.05$ )) meaning that there is in fact a significance difference in the applicability level between the Netherlands and African Developing Countries. Overall Lowest Price scores lowest with

77%, but still especially African developing countries still consider it to be well applicable with 87%.



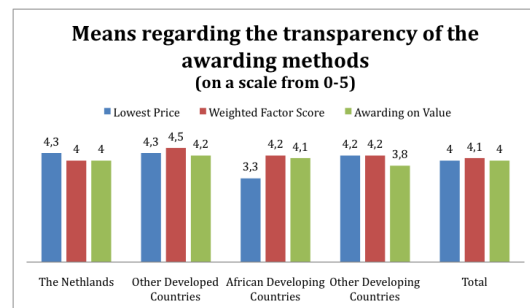
Graph 8. Applicability of Awarding methods

## 7.2 Perception of anti-corruption principles

The following section of the questionnaire took into account the three main legislative principles found in the literature study: transparency, fairness and equal treatment in order to investigate the purchasers' attitudes on the resistance to corruption concerning all three awarding methods.

### 7.2.1 Transparency

Overall all the methods score approximately similar, the only differences from the norm is the low score of lowest price in African developing countries with a 3,3 out of 5 while the total score is 4 out of 5. These findings have statistically been confirmed by an independent t-test conducted on the differences in attitudes of Dutch and African purchasers concerning transparency issues of all three methods. The only significant difference that has in fact been found is the one for Transparency of the lowest price method (t-test, indep. Samples, equal variances=3.424,  $df=47$ ,  $p=.001$ ).

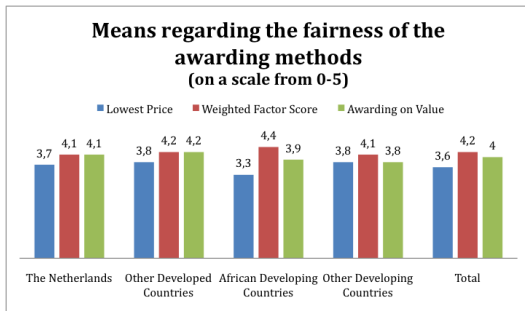


Graph 1 Means transparency awarding methods

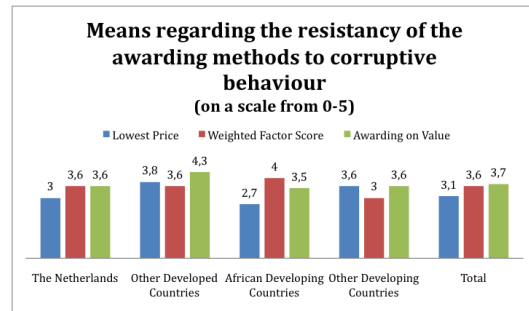
### 7.2.2 Fairness

WFS is by all participants throughout all country categories considered to be the most fair method with a total score of 4,2 out of 5. Followed by AoV and lastly Lowest Price, with a mean score of 3,6 and the Lowest single score coming from African developing countries of 3,3.

Results of the independent t-tests between the Netherlands and African countries show no significant differences in attitudes towards any of the three methods concerning fairness (t-test, indep. Samples, equal variances=0.823,  $df=47$ ,  $p=.415$ ).



Graph 2 Means fairness awarding methods

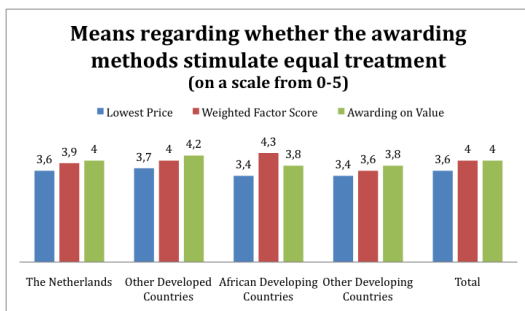


Graph 4 Means resistance to corruptive behavior of awarding methods

### 7.2.3 Equal Treatment

Overall, WFS and AoV have the same mean scores. For the Netherlands, other developed countries and other developing countries AoV scores slightly higher, whereas in African developing countries WFS wins with a high mean score of 4,3. Lowest Price turns out to be the method which is considered to be the least stimulating equal treatment.

Results of the independent t-tests between the Netherlands and African countries show no significant differences in attitudes towards any of the three methods concerning equal treatment (t-test, indep. Samples, equal variances=0.591, df=47, p=.557).



Graph 3 Means stimulation of equal treatment of awarding methods

### 7.2.4 Corruptive behaviour

Surprisingly, lowest Price is considered to be the least resistant to corruptive behaviour with a total score of only 3,1 even scoring as low as 2,7 in African developing countries. The opinions on WFS differ greatly. With a range of scores between 4 in African developing countries and 3 in other developing countries. AoV scores considerably higher in other developed countries with 4,3, while being at 3.6 on average.

Results of the independent t-tests between the Netherlands and African countries show no significant differences in attitudes towards any of the three methods concerning corruptive behavior (t-test, indep. Samples, equal variances=0.724, df=47, p=.473).

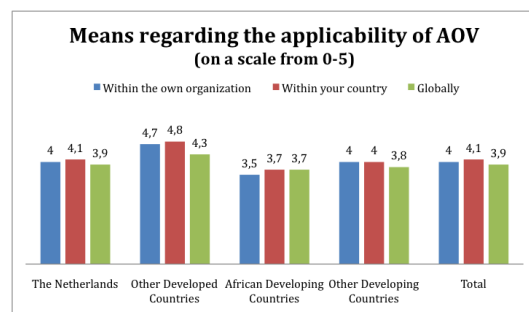
## 7.3 The Applicability of Awarding on Value

The following results section deals with the applicability of Awarding on Value in particular and investigates potential problems that come along with it

### 7.3.1 Attitudes towards organizational, national and global applicability of Awarding on Value

Other developing countries give with 4.8 an exceptionally high score for the applicability within their countries. Global applicability scores on average 3.9 out of 5.

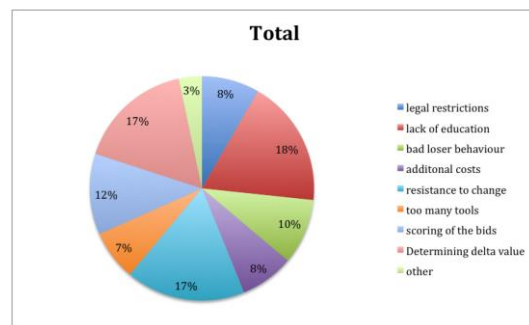
Results of the independent t-tests between the Netherlands and African countries however, show no significant differences in attitudes for organizational, national or global applicability of AoV (t-test, indep. Samples, equal variances=1.125, df=47, p=.266).



Graph 5 Means applicability AoV

### 7.3.2 Possible problems with the applicability of Awarding on Value

In total, the top three problems are considered to be a lack of education, followed by determining the Delta value and resistance to change. Country specific results find that for the developing categories next to those three aspects also legal aspects impose potential problems.



Graph 14. Problems influencing the applicability of AoV

## 8. DISCUSSION

### 8.1 Purchasing capabilities & attitudes (understand, familiarity, used, like, applicability)

Hypothesis (1) (*H1: AoV and WFS are understood by fewer purchasers, especially in developing countries*) has been proven to be wrong. In reference to literature it was assumed that purchasers from developing countries might have troubles concerning the understanding of the more complex MEAT methods due to the fact that their education and purchasing skills lack behind those of purchasers from developed countries. However, all questioned purchasers seem to have an equally good understanding of all three procurement methods. This can either be because they were well explained or that the respondents themselves have received good education, hence not necessarily being representative for their country group. Nevertheless hypothesis (11) (*H11: A lack of education is considered to be the main issue considering implementing AoV other than lowest price*) is supported by findings of the empirical research which rank education as the number one problem.

Hypotheses (2) and (3) (*H2: AoV is only known within the Dutch procurement community; H3: AoV has only been used within the Dutch procurement community*) are related to each other and have both surprisingly turned out to be false. Relatively many respondents state to be familiar with this very method even though it was developed, and theoretically is currently only used within the Netherlands. This is a sign that awareness for the method has been grown in some way and that it is spreading across the world. A possible explanation might be conferences or other procurement events where it possibly was presented. A surprise is the discovery that AoV has actually been used by almost half of all respondents. Even in developing countries one third of the questioned purchasers has already made use of the method, whereas in other developing countries even two thirds state to have done so which even exceeds the level of Dutch usage. However, overall AoV can be considered to be the least known and thereby also least used method when comparing the three. WFS seems to be the awarding method that is known, used and liked by the greatest amount of all respondents, hence in a nutshell being the most popular method. Awarding on lowest price turns out to be the least popular one. Thus, hypothesis (4) (*H4: LP is a less liked awarding method than AoV and WFS.*) is true. This result is supported by the literature findings which criticize that quality aspects are neglected preventing the provision of the best value for money.

However, what is striking is the fact that lowest price is at the same time the least liked but most commonly used method, in particular in developing countries. This is possibly related to the missing purchasing capabilities when it comes to applying more complex methods. Moreover, legal aspects need to be taken into consideration at this point. Given the results of the literature study, generally, in developing countries it is more accepted to apply awarding on lowest price based on the regulations of the World Bank. Other methods are there mostly only allowed in exceptional cases when procuring special goods and services. The literature findings are supported by the empirical evidence listing legal issues as one of the top potential problems when it comes to implementing AoV. Consequently, hypothesis (5) as well as (10) (*H5: AoV is considered to be perceived more difficult to implement in developing countries than in developed countries.*) has been proven to be true whereas hypothesis (10) (*H10: AoV is applicable in both developed and developing countries.*) generally must rather be rejected under

the circumstances of law, lacking skills and also considering the attitudes and opinions of the purchasers. However, this does not mean that it cannot be applied in certain developing countries where the circumstances are right and special goods or services are procured leading to exceptional rules. In particular, article 2.52 of the World Bank's procurement manual can be a way to apply AoV nevertheless.

### 8.2 Perception of anti-corruption principles (transparency, fairness, equal treatment)

Hypothesis (6) (*H6: LP is considered to be more transparent than AoV and WFS.*) cannot be confirmed by neither literature nor empirical findings. All three methods score in total almost equal when it comes to transparency. However, a fact worth discussing is that awarding on lowest price which is most commonly used in developing countries gets the lowest scores from Africa implying that the purchasers there are aware of its drawbacks. Concerning WFS and AoV transparency issues could appear in the form of subjective scoring methods and difficult evaluation of quality. Referring to Crow's (2007) ambitions to provide with AoV a more transparent awarding method, hypothesis (7) has been set up (*H7: AoV is considered to be considered to be the fairest awarding method throughout all country categories*). However, empirical findings show that WFS is perceived to be slightly fairer. Hypothesis (8) (*H8: Of all three methods, LP is considered to be the one that stimulates equal treatment the least.*) has found support in empirical evidence. Equal treatment is in fact not assured when only taking the price into consideration since other suppliers which might offer more value for the money are excluded. Hypothesis (9) (*H9: LP is considered to be more resistant to corruptive behavior than AoV and WFS.*) assumes that lowest price is the method prevents corruption to the greatest extent as this is the reason why it is applied in most countries. However, this hypothesis unexpectedly turned out to be false. The awarding method which on paper is supposed to be the most suitable to inhibit corruption, is perceived as the least resistant to fraud by the respondents. Especially purchasers from developing countries give low scores on this subject and method what can be interpreted as a criticism on their currently used awarding method since they neither like nor find it effective regarding the prevention of corruptive activities after all. Overall, AoV and WFS are considered the better alternative relating to most of the issues addressed in the questionnaire.

## 9. CONCLUSION

This research has investigated conceptual facts, legislative directives as well as attitudes and perceptions of purchasers from countries across the world in order to investigate the question to what extent the three awarding methods are applicable in various countries. Procurement legislation has been found to be a fundamental restriction when it comes to being able to apply, in particular AoV, whereas WFS seems to be allowed to be applied by most laws. Purchasing capabilities were determined to be another essential basis for any of the more complex methods to work. Given all information found in literature and all data collected, it can be concluded that LP might be the most easy method to apply legally as well as capability-wise, however attitudes show dislike and concerns. Both MEAT methods discussed in this research have been perceived as interesting alternative options of awarding contracts and could be applied in countries where the requirements discussed above are fulfilled. No conclusive answer can be given to the question whether one of the two

MEAT methods are actually better applicable than the other. Ultimately, WFS is slightly ahead in the overall rating of benefits as well as applicability compared to AoV. Legal-wise WFS is mentioned more often, especially in national law and in relation to the awarding of consultancy services. However, since AoV is potentially allowed for the procurement of goods and equipment under the World Bank's law which in turn is the basis for law in most developing countries, it can be concluded that both can make a chance on being applied for different kind of procurements.

## 9.1 Limitations

Several limitations apply to this research. First of all, a great limitation was the restricted access to the target group and the fact that there was little control over who was ultimately reached by the questionnaire due to the snowball distribution method. Furthermore, the relatively low number of responses and the uneven sample sizes made it rather difficult to draw comprehensive conclusion and apply statistical methods and tests. In respect to this, not all possible relation could be statistically tested. Another limitation was the trustworthiness of the respondents as there was no control on whether they faithfully answered all questions. Moreover, there was a lack of prior research material, in particular concerning AoV. In addition, an important constraint was the limit of pages of this research paper what led to the need to leave out and shorten a lot of interesting data, discussion and statistical analysis. In addition, legal material was analyzed in the best interest, however, without having legal expertise which might have led to wrong assumptions.

## 9.2 Further research

Basically, the questionnaire that was especially developed for this research study could be sent out to any other countries in order to investigate the research topic with a larger scale comparative research across more countries or an in-depth research within a specific country or region. In addition to that, more awarding methods could be added using the same survey questionnaire structure.

## 10. ACKNOWLEDGEMENTS

First of all I want to thank my supervisor Prof. Dr. Jan Telgen for dedicating his time to assisting us in the process of writing the Bachelor Thesis. He has supported us with great professional knowledge, interesting ideas and valuable feedback. Thanks to him and his enthusiasm during the lectures in the first year Purchasing course, I have developed the aspiration to pursue a career in Procurement.

Moreover, my gratitude goes to Dr. Fredo Schotanus, who as a second supervisor has put his efforts into reading and grading this research.

Additionally, I would like to show appreciation to Stella Weise, Lena Schmidt and especially H el ene Bussink. We have been a good team, collaborated well on the empirical part of the research and assisted each other well in times of problems and frustrations.

Furthermore, I want to thank my family and friends who have always supported me throughout the whole time of my Bachelor study.

Last but not least, my acknowledgements go to the IBA programme committee, including Corrie Huijs, Tanya

Bondarouk, Aleksandra Kova , Inge van Haare, and Sanne Spuls.

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## 12. APPENDICES

### 12.1 Appendix A: Transcript of Survey

#### General Instructions

Being students at the University of Twente, we are working on our Bachelor Thesis in Supply Management (supervised by Prof. Dr. Jan Telgen).

What is the purpose of this investigation?

We are researching award methods

What happens to the information gathered with this survey?

We will use the data into our Bachelor Thesis report. Anything you mention will be treated confidentially. You will not be named in our report and it will not be possible to identify you in any way. You have the right to stop the survey at any time, and to have your data withdrawn from this study.

Thank you for reading this information

If you have any questions/concerns, during or after the investigation, please contact us, Julia Dombrowski (j.dombrowski-1@student.utwente.nl) or H el ene Bussink ([h.a.e.bussink@student.utwente.nl](mailto:h.a.e.bussink@student.utwente.nl)).

#### Basic Information

Country of Residence

- List of 237 countries to chose from

What is your highest degree of education?

- None
- Elementary Education
- High School Degree
- Undergraduate Degree
- Graduate Degree
- Phd Degree
- Other

To which type does organization belong?

- Local Government Agency
- State Government Agency
- National/Federal Government Agency
- Small Private Business
- Medium/Large Private Business
- Multinational Company
- Other

In which industry does your organization operate?

- Agriculture and Mining
- Business Services



- Computer and Electronics
- Consumer Services
- Education
- Energy and Utilities
- Financial Services
- Government
- Health, Pharmaceutical and Biotechnic
- Manufacturing
- Media and Entertainment
- Non-Profit
- Real Estate and Construction
- Retail
- Software and Internet
- Telecommunications
- Transportation and Storage
- Travel Recreation and Leisure
- Wholesale and Distribution
- Other

What is your main activity?

- Ordering
- Making contracts
- Managing the purchasing function
- Setting policies for purchasing and overseeing execution

How long have you been in this function?

- < 1 year
- 1-2 years
- 2-5 years
- 5-10 years
- > 10 years

## Lowest Price

### Overview:

#### Description Awarding on Lowest Price – International Competitive Bidding:

When using competitive bidding, the contract is awarded to the bid with the lowest price offer.

Do you understand the method?

- Yes
- No
  - If no, what are the parts you did not understand?

Are you familiar with this method?

- Yes
- No

Have you ever used this method?

- Yes
- No

Do you like this method?

- Yes
- No

Do you think this method is applicable in your country?

- Yes
- No
- I do not know

In your opinion, is this method transparent?

This is not simply about discussing disclosure and openness but also the removal of discretion and subjectivity. Evaluation must be based on objective criteria that are known to bidders in advance.

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to be transparent?

In your opinion is this method fair?

Evaluation criteria and the evidence required from bidders must be actually and demonstrably related to the subject matter of the contract and applied proportionally to the stated objectives.

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to be fair?

In your opinion, does this method stimulate equal treatment of suppliers?

All bidders and potential bidders must be given the same opportunity, based on the same information and criteria, and evaluated in a non-discriminatory manner.

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to stimulate equal treatment?

Overall, do you consider this method to be resistant to corruptive behavior?

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to be resistant to corruptive behavior?

## Weighted Factor Score

During the award phase, other criteria can be included next to the price. Examples are product quality, process quality, delivery time, past experiences and sustainability. These can be included in the following method.

### Overview

OVERVIEW WFS:	
1	In Weighted Factor, firstly, all relevant criteria are determined.
2	Then, weights are assigned to each criteria according to importance
3	Consequently, all suppliers are awarded scores on all criteria
4	These scores are multiplied (weighted) with the respective weights of the criteria
5	For each supplier $j$ the total score is defined as $WFS_j$
6	The supplier with the highest total score is awarded the contract

### Case Example

CASE EXAMPLE:				
The table below shows a case where WFS is applied.				
	Criteria <b>1</b>			
Weight <b>2</b>	Price 0.4	Quality 0.6		
There are three bids for this tender. The table below shows their scores for each criteria:				
Supplier	Price	Quality		
A	8	4		
B	6	6		
C	4	8		
The table below shows multiplication process of the scores with their respective weights as well as the overall result:				
Supplier	Price	Quality		Total WFS <b>5</b>
A	$8 * 0.4$	Price Point 3.2	Quality Points $4 * 0.6$	5.6
B	$6 * 0.4$ <b>4</b>	2.4	$6 * 0.6$ <b>4</b>	6
C	$4 * 0.4$	1.6	$8 * 0.6$	6.4 <b>6</b>

Do you understand the method?

- Yes
- No
  - If no, what are the parts you did not understand?

Are you familiar with this method?

- Yes
- No

Have you ever used this method?

- Yes
- No

Do you like this method?

- Yes
- No

Do you think this method is applicable in your country?

- Yes
- No
- I do not know

In your opinion, is this method transparent?

This is not simply about discussing disclosure and openness but also the removal of discretion and subjectivity. Evaluation must be based on objective criteria that are known to bidders in advance.

1 2 3 4 5

---

Not at all      Very well

What are aspects you do not consider to be transparent?

In your opinion is this method fair?

Evaluation criteria and the evidence required from bidders must be actually and demonstrably related to the subject matter of the contract and applied proportionally to the stated objectives.

1 2 3 4 5

---

Not at all      Very well

What are aspects you do not consider to be fair?

In your opinion, does this method stimulate equal treatment of suppliers?

All bidders and potential bidders must be given the same opportunity, based on the same information and criteria, and evaluated in a non-discriminatory manner.

1 2 3 4 5

---

Not at all      Very well

What are aspects you do not consider to stimulate equal treatment?

Overall, do you consider this method to be resistant to corruptive behavior?

1 2 3 4 5

---

Not at all      Very well

What are aspects you do not consider to be resistant to corruptive behavior?

## Awarding on Value

Awarding on Value (AoV) is a method for determining the best supplier bid under multiple award criteria, known in Public Procurement as the “Most Advantageous Tender” (MEAT).

AoV takes into consideration both the commercial and the technical proposal of a bid. The commercial part is evaluated as the bid price by the i-th bidder  $P_i$ . With regards to the technical part of the proposal, the scope of the method is to determine the technical value of the bid concerning the quality criteria. Basically, the method addresses the assessment of the qualitative features of the bids from a monetary perspective: for each criterion (e.g. product quality, process quality, delivery time, past experience, sustainability), the impact in terms of added value is established. Then the bid price is corrected by subtracting the total added value of the bid (Sciancalepore & Telgen, ????)..

### Overview

DESCRIPTION AoV:	
1	Decide on your technical quality criteria and make them publicly known to all parties involved
2	Define the value of the minimum required quality and maximum possible quality
3	Determine the technical quality score
4	Calculate the technical quality $q_i$
5	Consider how much you are willing to pay in order to move from the minimum required quality to the maximum possible quality, hence for added value. This parameter is set as the Delta Value $V$ and represents the highest added value considered possible for tenders.
6	Determine the technical values. This is the translation into monetary terms by multiplying the Delta Value with the technical quality $q_i$ .
7	Sum up the technical values of all criteria
8	Do the price correction by subtracting the technical values from the commercial bid price. It is not before this point that the bid price is taken into consideration and made known to the evaluators.
9	The lowest corrected price wins

$$\frac{Q_{min}}{Q_{max}}$$

$$Q_i$$

$$q_i = \frac{Q_i - Q_{min}}{Q_{max} - Q_{min}}$$

$$V_i$$

$$Vq_i$$

$$\sum_i V_j q_{ij}$$

$$CP_i = P_i - \sum_j V_j q_{ij}$$

## Case Example

### CASE EXAMPLE:

The table below shows a case where AoV is applied. There are three bids for this tender. The minimum acceptable technical score is  $Q_{min}=60$  (on a maximum technical score  $Q_{max}=100$ ) (Step 2) and the Delta Value has been set to  $V=100,000$  \$ (Step 5).

Commercial Proposal		Technical Proposal				
		Step 3	Step 4	Step 6	Step 8	Step 9
Bid #	Price P (\$)	Technical quality score Q	Technical quality $q_i$	Technical Value $Vq_i$ (\$)	Corrected price $CP_i$ (\$)	Rank
1	150,000	80	0.50	50,000	100,000	<u>1</u>
2	200,000	96	0.90	90,000	110,000	2
3	120,000	62	0.05	5,000	115,000	3

Then bidder 1 will be awarded the tender, as it offers the best corrected price.

Do you understand the method?

- Yes
- No
  - If no, what are the parts you did not understand?

Are you familiar with this method?

- Yes
- No

Have you ever used this method?

- Yes
- No

Do you like this method?

- Yes
- No

Do you think this method is applicable in your country?

- Yes
- No
- I do not know

In your opinion, is this method transparent?

This is not simply about discussing disclosure and openness but also the removal of discretion and subjectivity. Evaluation must be based on objective criteria that are known to bidders in advance.

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to be transparent?

In your opinion is this method fair?

Evaluation criteria and the evidence required from bidders must be actually and demonstrably related to the subject matter of the contract and applied proportionally to the stated objectives.

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to be fair?

In your opinion, does this method stimulate equal treatment of suppliers?

All bidders and potential bidders must be given the same opportunity, based on the same information and criteria, and evaluated in a non-discriminatory manner.

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to stimulate equal treatment?

Overall, do you consider this method to be resistant to corruptive behavior?

1 2 3 4 5

Not at all      Very well

What are aspects you do not consider to be resistant to corruptive behavior?

Overall, you consider Awarding on Value to be applicable to:

You and your colleague

1 2 3 4 5

Not at all      Very well

Your country

1 2 3 4 5

Not at all      Very well

Globally

1 2 3 4 5

Not at all      Very well

What do you think possible problems in the application of this methods could be?

- Legal restrictions
- Lack of education
- Bad loser behaviour
- Additional costs
- Resistance to change
- Too many tools

- Scoring of the bids
- Determining the Delta value
- Other

Do you have any comments on the Awarding on Value method?

**End**

Thank you very much for your cooperation. This is highly appreciated.

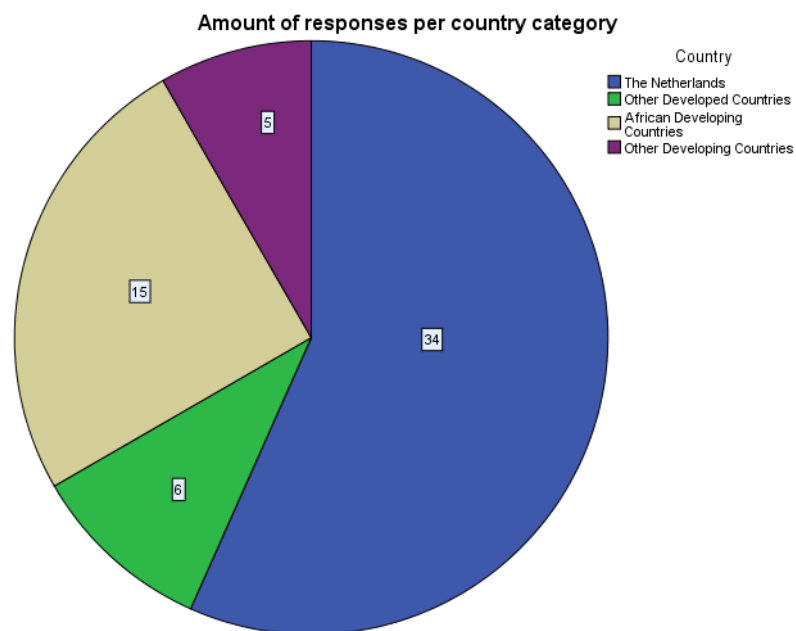
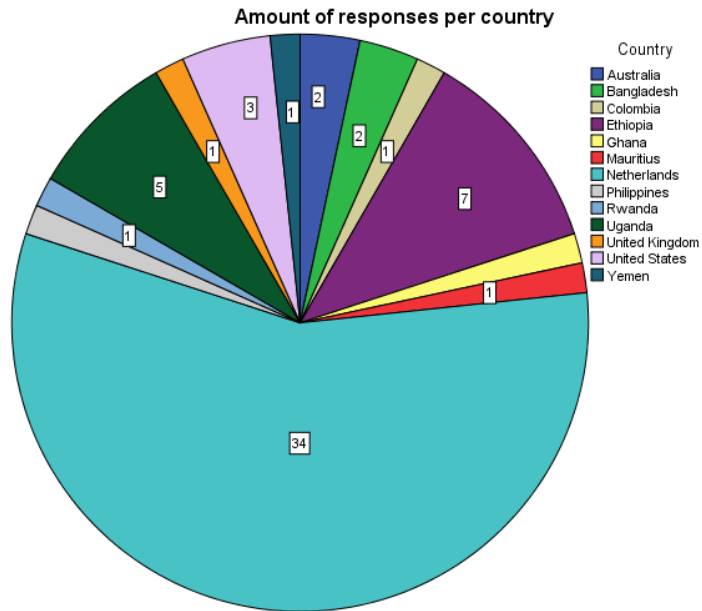
Would you like to receive the results of our research?

- Yes
  - If you would like to receive the results of our survey, please fill in your email address below
- No



## 12.2 Appendix B: SPSS Output and Graphs

### Country of Residence



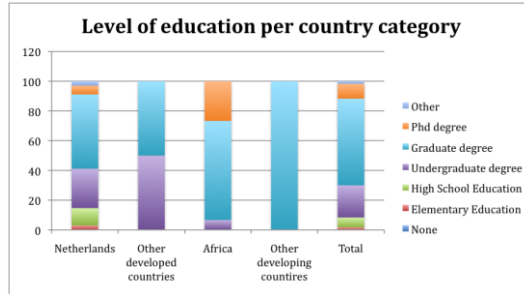
### Level of Education

Education \* Country Crosstabulation

Count		Country												Total		
		Australia	Bangladesh	Colombia	Ethiopia	Ghana	Mauritius	Netherlands	Philippines	Rwanda	Uganda	United Kingdom	United States		Yemen	
Education	Elementary Education	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	High School Education	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
	Undergraduate degree	0	0	0	1	0	0	9	0	0	0	0	3	0	0	13
	Graduate degree	2	2	1	6	0	1	17	1	1	2	1	0	1	35	
	Phd degree	0	0	0	0	1	0	2	0	0	3	0	0	0	6	
	Other	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Total		2	2	1	7	1	1	34	1	1	5	1	3	1	60	

Education \* Country Crosstabulation

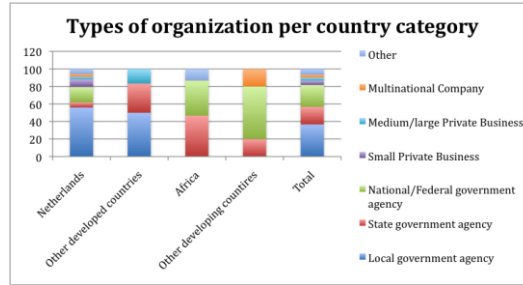
		Country												Total		
		Australia	Bangladesh	Colombia	Ethiopia	Ghana	Mauritius	Netherlands	Philippines	Rwanda	Uganda	United Kingdom	United States		Yemen	
Education	Elementary Education	Count	0	0	0	0	0	0	1	0	0	0	0	0	0	1
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	1,7%
	High School Education	Count	0	0	0	0	0	0	4	0	0	0	0	0	0	4
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	11,8%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	6,7%
	Undergraduate degree	Count	0	0	0	1	0	0	9	0	0	0	0	3	0	13
		% within Country	0,0%	0,0%	0,0%	14,3%	0,0%	0,0%	26,5%	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	21,7%
	Graduate degree	Count	2	2	1	6	0	1	17	1	1	2	1	0	1	35
		% within Country	100,0%	100,0%	100,0%	85,7%	0,0%	100,0%	50,0%	100,0%	100,0%	40,0%	100,0%	0,0%	100,0%	58,3%
	Phd degree	Count	0	0	0	0	1	0	2	0	0	3	0	0	0	6
		% within Country	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	5,9%	0,0%	0,0%	60,0%	0,0%	0,0%	0,0%	10,0%
	Other	Count	0	0	0	0	0	0	1	0	0	0	0	0	0	1
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	1,7%
Total		Count	2	2	1	7	1	1	34	1	1	5	1	3	1	60
		% within Country	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%



Type of Organization

Organization \* Country Crosstabulation

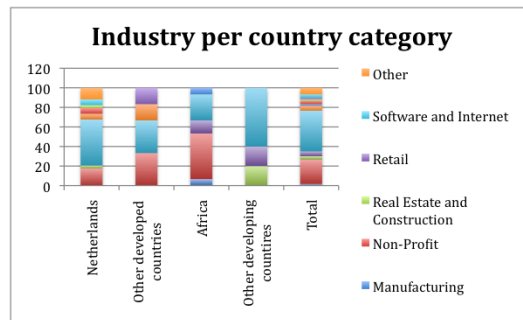
		Country												Total	
		Australia	Bangladesh	Colombia	Ethiopia	Ghana	Mauritius	Netherlands	Philippines	Rwanda	Uganda	United Kingdom	United States		Yemen
Organization	Local government agency	Count	0	0	0	0	0	0	19	0	0	0	3	0	22
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	55,9%	0,0%	0,0%	0,0%	100,0%	0,0%	36,7%
	State government agency	Count	2	1	0	2	0	1	2	0	0	4	0	0	12
		% within Country	100,0%	50,0%	0,0%	28,6%	0,0%	100,0%	5,9%	0,0%	0,0%	80,0%	0,0%	0,0%	20,0%
	National/Federal government agency	Count	0	1	0	5	1	0	6	1	0	0	0	1	15
		% within Country	0,0%	50,0%	0,0%	71,4%	100,0%	0,0%	17,6%	100,0%	0,0%	0,0%	0,0%	100,0%	25,0%
	Small Private Business	Count	0	0	0	0	0	0	3	0	0	0	0	0	3
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	8,8%	0,0%	0,0%	0,0%	0,0%	0,0%	5,0%
	Medium/large Private Business	Count	0	0	0	0	0	0	1	0	0	0	1	0	2
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	100,0%	0,0%	3,3%
	Multinational Company	Count	0	0	1	0	0	0	1	0	0	0	0	0	2
		% within Country	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	3,3%
	Other	Count	0	0	0	0	0	0	2	0	1	1	0	0	4
		% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	5,9%	0,0%	100,0%	20,0%	0,0%	0,0%	6,7%
Total		Count	2	2	1	7	1	1	34	1	1	5	1	3	60
		% within Country	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%



## Type of Industry

**Industry \* Country Crosstabulation**

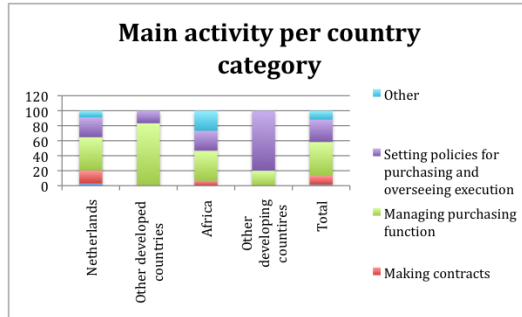
Industry	Country	Country														Total	
		Australia	Bangladesh	Colombia	Ethiopia	Ghana	Mauritius	Netherlands	Philippines	Rwanda	Uganda	United Kingdom	United States	Yemen			
Consumer Services	Count	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	% within Country	0,0%	0,0%	0,0%	14,3%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	1,7%
Education	Count	1	0	0	2	0	0	6	0	1	4	0	1	0	0	0	15
	% within Country	50,0%	0,0%	0,0%	28,6%	0,0%	0,0%	17,6%	0,0%	100,0%	80,0%	0,0%	33,3%	0,0%	0,0%	0,0%	25,0%
Energy and Utilities	Count	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2
	% within Country	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	3,3%
Financial Services	Count	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	3
	% within Country	0,0%	0,0%	0,0%	14,3%	0,0%	0,0%	0,0%	0,0%	0,0%	20,0%	0,0%	100,0%	0,0%	66,7%	0,0%	5,0%
Government	Count	0	2	0	2	1	1	16	1	0	0	0	2	0	0	0	25
	% within Country	0,0%	100,0%	0,0%	28,6%	100,0%	100,0%	47,1%	100,0%	0,0%	0,0%	0,0%	66,7%	0,0%	0,0%	0,0%	41,7%
Health, Pharmaceutical, and Biotech	Count	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3
	% within Country	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	5,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	5,0%
Manufacturing	Count	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	% within Country	0,0%	0,0%	0,0%	14,3%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	1,7%
Non-Profit	Count	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	5,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	3,3%
Real Estate and Construction	Count	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	1,7%
Retail	Count	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	1,7%
Software and Internet	Count	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	5,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	3,3%
Other	Count	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	11,8%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	6,7%
Total	Count	2	2	1	7	1	1	34	1	1	5	1	3	1	0	0	60
	% within Country	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%



## Main procurement activity

**Activity \* Country Crosstabulation**

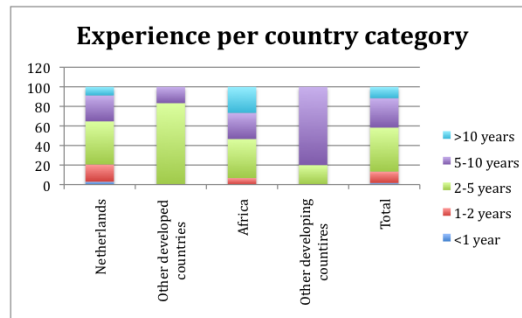
Activity	Country	Country														Total	
		Australia	Bangladesh	Colombia	Ethiopia	Ghana	Mauritius	Netherlands	Philippines	Rwanda	Uganda	United Kingdom	United States	Yemen			
Ordering	Count	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	1,7%
Making contracts	Count	0	0	0	1	0	0	6	0	0	0	0	0	0	0	0	7
	% within Country	0,0%	0,0%	0,0%	14,3%	0,0%	0,0%	17,6%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	11,7%
Managing purchasing function	Count	1	1	0	5	0	0	15	0	0	1	1	3	0	0	0	27
	% within Country	50,0%	50,0%	0,0%	71,4%	0,0%	0,0%	44,1%	0,0%	0,0%	20,0%	100,0%	100,0%	0,0%	0,0%	0,0%	45,0%
Setting policies for purchasing and overseeing execution	Count	1	1	1	1	1	1	9	1	0	1	0	0	0	1	0	18
	% within Country	50,0%	50,0%	100,0%	14,3%	100,0%	100,0%	26,5%	100,0%	0,0%	20,0%	0,0%	0,0%	0,0%	100,0%	0,0%	30,0%
Other	Count	0	0	0	0	0	0	3	0	1	3	0	0	0	0	0	7
	% within Country	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	8,8%	0,0%	100,0%	60,0%	0,0%	0,0%	0,0%	0,0%	0,0%	11,7%
Total	Count	2	2	1	7	1	1	34	1	1	5	1	3	1	0	0	60
	% within Country	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%



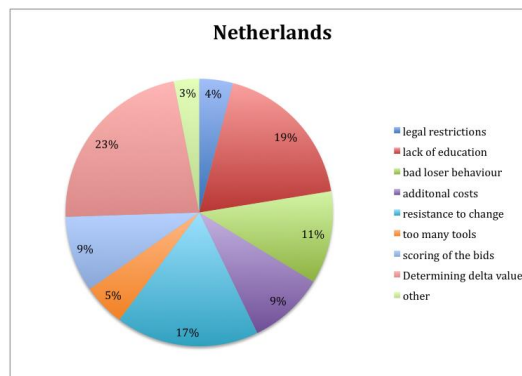
## Experience

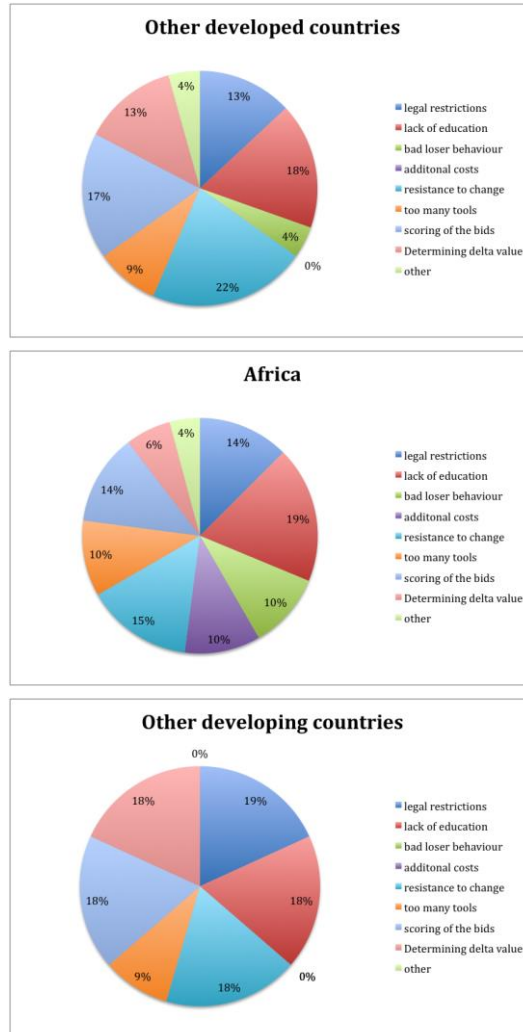
Experience \* Country Crosstabulation

Experience		Country													Total
		Australia	Bangladesh	Colombia	Ethiopia	Ghana	Mauritius	Netherlands	Philippines	Rwanda	Uganda	United Kingdom	United States	Yemen	
<1 year	Count	0	0	1	0	0	0	1	0	0	0	0	0	0	2
	% within Country	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	2,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	3,3%
1-2 years	Count	0	1	0	0	1	0	2	0	1	1	0	0	0	6
	% within Country	0,0%	50,0%	0,0%	0,0%	100,0%	0,0%	5,9%	0,0%	100,0%	20,0%	0,0%	0,0%	0,0%	10,0%
2-5 years	Count	1	0	0	1	0	0	15	0	0	1	0	0	0	18
	% within Country	50,0%	0,0%	0,0%	14,3%	0,0%	0,0%	44,1%	0,0%	0,0%	20,0%	0,0%	0,0%	0,0%	30,0%
5-10 years	Count	1	0	0	3	0	0	9	1	0	1	0	0	0	15
	% within Country	50,0%	0,0%	0,0%	42,9%	0,0%	0,0%	26,5%	100,0%	0,0%	20,0%	0,0%	0,0%	0,0%	25,0%
>10 years	Count	0	1	0	3	0	1	7	0	0	2	1	3	1	19
	% within Country	0,0%	50,0%	0,0%	42,9%	0,0%	100,0%	20,6%	0,0%	0,0%	40,0%	100,0%	100,0%	100,0%	31,7%
Total	Count	2	2	1	7	1	1	34	1	1	5	1	3	1	60
	% within Country	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%



## Problems with the application of AoV





### 12.3 Appendix C: Z-Tests

To analyse the differences between the proportions of the attitudes one two-proportion z-test is used for every hypotheses. This is done using the following corresponding formulas.

In order to find the P-Value, first the pooled sample proportion and the Standard Error need to be calculated.

$$\hat{p}_{pooled} = \frac{x_1 + x_2}{n_1 + n_2}$$

$$SE_{pooled}(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{\hat{p} \hat{q}}{n_1} + \frac{\hat{p} \hat{q}}{n_2}}$$

Subsequently a two proportion z-test is conducted.

$$z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\frac{\hat{p} \hat{q}}{n_1} + \frac{\hat{p} \hat{q}}{n_2}}} \text{ N (0,1) distribution}$$

Looking at table A the corresponding P-Value to the Z-Value can be found. If it is smaller than  $\alpha=0.05$  there is enough evidence to reject the Null Hypothesis.

As there needs to be a sample size of  $n > 5$  for the test in order to be valid, there can to the greatest extent only be drawn comparisons between the Netherlands and African Developing countries.

### 12.3.1 Purchasing capabilities, preferences & experience

#### 12.3.1.1 Understand

*H1: Not all purchasers understand the methods to the same extent.*

In this case no statistical test can be conducted as the sample size is too small.

$$H_0: p_{Dutch} - p_{African} = 0$$

*There is no difference in the level of understanding AoV when comparing the Dutch and African purchasers.*

$$H_1: p_{Dutch} > p_{African}$$

*The purchasers from Developed Countries understand AoV better than those from Developing Countries*

$$x_1 = 38 \quad n_1 = 40 \quad x_2 = 19 \quad n_2 = 20$$

$$\hat{p}_{pooled} = \frac{38 + 19}{40 + 20} = 0,95$$

$$SE_{pooled} = \sqrt{\frac{0,95 \cdot 0,05}{40} + \frac{0,95 \cdot 0,05}{20}} = 0,06$$

$$z = \frac{\left(\frac{38}{40} - \frac{19}{20}\right) - 0}{0,06} = 0 \text{ N}(0,1) \text{ distribution}$$

Looking at table A using  $z = 0$  we find the P-Value to be  $P = 0.5$

Having used a left sided z-test, we find that P-value is smaller than  $P = 1 - \alpha = 0.95$  (for  $\alpha = 0.05$ ). Therefore, we do not have enough evidence to reject  $H_0$ . Consequently, we must conclude that there is no significant difference in the understanding levels of the AoV between purchasers from Developing and Developed Countries

#### 12.3.1.2 Familiarity

*H2: Awarding on Value is only known within the Dutch procurement community*

$$H_0: p_{Dutch} - p_{African} = 0$$

*There is no difference in similarity level when comparing the Dutch and African purchasers.*

$$H_1: p_{Dutch} > p_{African}$$

*The Dutch purchasers are likely to be more familiar with the method.*

$$x_1 = 27 \quad n_1 = 34 \quad x_2 = 8 \quad n_2 = 15$$

$$\hat{p}_{pooled} = \frac{27 + 8}{34 + 15} = 0,714$$

$$SE_{pooled} = \sqrt{\frac{0,714 \cdot 0,286}{34} + \frac{0,714 \cdot 0,286}{15}} = \sqrt{0,006 + 0,0136} = 0,14$$

$$z = \frac{\left(\frac{27}{34} - \frac{8}{15}\right) - 0}{0,14} = 1,863 \text{ N}(0,1) \text{ distribution}$$

Looking at table A using  $z = 1,86$  we find the P-Value to be  $P = 0.9686$

Having used a right sided z-test, we find that P-value is larger than  $P = 1 - \alpha = 0.95$  (for  $\alpha = 0.05$ ). Therefore, we do have enough evidence to reject  $H_0$ . Consequently, we must conclude that there is a significant difference in the familiarity levels between Dutch and African purchasers.

#### 12.3.1.3 Used

H3: Awarding on Value has only been used within the Dutch procurement community

$$H_0: p_{Dutch} - p_{African} = 0$$

There is no difference in usage level when comparing the Dutch and African purchasers.

$$H_1: p_{Dutch} > p_{African}$$

The Dutch purchasers have been using AoV more often

$$x_1 = 17 \quad n_1 = 34 \quad x_2 = 5 \quad n_2 = 15$$

$$\hat{p}_{pooled} = \frac{17 + 5}{34 + 15} = 0.449$$

$$SE_{pooled}(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{0.449 * 0.551}{34} + \frac{0.449 * 0.551}{15}} = 0.154$$

$$z = \frac{\left(\frac{17}{34} - \frac{5}{15}\right) - 0}{0.154} = 1.082 \text{ N (0,1) distribution}$$

Looking at table A using  $z = 1.8$  we find the P-Value to be  $P = 0.8599$

Having used a right sided z-test, we find that P-value is smaller than  $P = 1 - \alpha = 0.95$  (for  $\alpha = 0.05$ ). Therefore, we do not have enough evidence to reject  $H_0$ . Consequently, we must conclude that there is no significant difference in the usage levels of the Awarding on Value Method between purchasers from the Netherlands and African Developing Countries.

#### 12.3.1.4 Like

H4: Awarding on lowest price is especially liked by Developing countries, whereas Awarding on Value and Weighted are more popular in Developed Countries.

$$H_0: p_{Developed} - p_{Developing} = 0$$

There is no difference concerning liking the lowest price method when comparing the Developing and Developed countries.

$$H_1: p_{Developed} < p_{Developing}$$

Developing countries are likely to like the Awarding on Lowest Price method more than Developed Countries.

$$x_1 = 24 \quad n_1 = 40 \quad x_2 = 12 \quad n_2 = 20$$

$$\hat{p}_{pooled} = \frac{24 + 12}{40 + 20} = 0.6$$

$$SE_{pooled}(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{0.6 * 0.4}{40} + \frac{0.6 * 0.4}{20}} = \sqrt{0.006 + 0.012} = 0.134$$

$$z = \frac{(0.6 - 0.6) - 0}{0.134} = 0 \text{ N (0,1) distribution}$$

Looking at table A using  $z = 0$  we find the P-Value to be  $P = 0.5$

Having used a left sided z-test, we find that P-value is smaller than  $P = 1 - \alpha = 0.95$  (for  $\alpha = 0.05$ ). Therefore, we do not have enough evidence to reject  $H_0$ . Consequently, we must conclude that there is no significant difference in the likeness levels of the Lowest Price Method between purchasers from Developing and Developed Countries

#### 12.3.1.5 Applicability

H5: Awarding on Value is considered to be perceived more difficult to implement in countries other than the Netherlands.

$$H_0: p_{Dutch} - p_{African} = 0$$

There is no difference when trying to implement AoV in the Netherlands and in African Developing Countries

$$H_1: p_{Dutch} < p_{African}$$

It is more difficult to implement in African Developing countries than in the Netherlands

$$x_1 = 31 \quad n_1 = 34 \quad x_2 = 9 \quad n_2 = 15$$

$$\hat{p}_{pooled} = \frac{31+9}{34+15} = 0.82$$

$$SE_{pooled}(\hat{p}_1 - \hat{p}_2) = \sqrt{\frac{0.82 \cdot 0.18}{34} + \frac{0.82 \cdot 0.18}{15}} = 0.119$$

$$z = \frac{\left(\frac{31}{34} - \frac{9}{15}\right) - 0}{0.119} = 2.619 \text{ N (0,1) distribution}$$

Looking at table A using  $z = 2.62$  we find the P-Value to be  $P = 0.9956$

Having used a left sided z-test, we find that P-value is larger than  $P = 1 - \alpha = 0.95$  (for  $\alpha = 0.05$ ). Therefore, we do not have enough evidence to reject  $H_0$ . Consequently, we must conclude that there is a significant difference in the applicability levels of the AoV between the Netherlands and African Developing Countries.

## 12.4 Appendix D: T-Test

### 12.4.1 Perception of anti-corruption principles

#### 12.4.1.1 Transparency

H6: Awarding on Value is considered to be the most transparent awarding method.

		Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
TransparentLP	Equal variances assumed	,557	,459	3,424	47	,001	,998	,291	,412	1,584	
	Equal variances not assumed			3,241	23,777	,004	,998	,308	,362	1,634	
TransparentWFS	Equal variances assumed	,018	,893	-1,050	47	,299	-,229	,219	-,669	,210	
	Equal variances not assumed			-1,074	28,379	,292	-,229	,214	-,667	,208	
TransparentAOV	Equal variances assumed	1,355	,250	-,249	47	,804	-,067	,267	-,604	,471	
	Equal variances not assumed			-,246	26,005	,808	-,067	,271	-,624	,490	

(t-test, indep. Samples, equal variances=3.424, df=47, p=.001).

#### 12.4.1.2 Fairness

H7: Awarding on value is considered to be the most fair awarding method.

		Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
FairLP	Equal variances assumed	,296	,589	,823	47	,415	,314	,381	-,453	1,081	
	Equal variances not assumed			,821	26,732	,419	,314	,382	-,470	1,098	
FairWFS	Equal variances assumed	,028	,868	-1,398	47	,169	-,312	,223	-,760	,137	
	Equal variances not assumed			-1,497	31,742	,144	-,312	,208	-,736	,113	
FairAOV	Equal variances assumed	1,119	,296	,457	47	,649	,125	,274	-,426	,677	
	Equal variances not assumed			,436	24,127	,667	,125	,288	-,468	,719	

(t-test, indep. Samples, equal variances=0.823, df=47, p=.415).



### 12.4.1.3 Equal Treatment

H8: Awarding on value is considered to be the most stimulating to equal treatment awarding method

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
EqualLP	Equal variances assumed	,091	,764	,591	47	,557	,247	,418	-,593	1,087
	Equal variances not assumed			,590	26,742	,560	,247	,419	-,612	1,106
EqualWFS	Equal variances assumed	1,814	,184	-1,445	47	,155	-,325	,225	-,779	,128
	Equal variances not assumed			-1,367	23,752	,184	-,325	,238	-,817	,166
EqualAOV	Equal variances assumed	,454	,504	,696	47	,490	,200	,287	-,378	,778
	Equal variances not assumed			,690	26,338	,496	,200	,290	-,395	,795

(t-test, indep. Samples, equal variances=0.591, df=47, p=.557).

### 12.4.1.4 Corruptive behavior

H9: Awarding on Value is considered to be the awarding method which is most resistant to corruptive behavior

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CorruptionLP	Equal variances assumed	,686	,412	,724	47	,473	,296	,409	-,527	1,119
	Equal variances not assumed			,703	25,180	,488	,296	,421	-,571	1,163
CorruptionWFS	Equal variances assumed	1,038	,313	-,134	47	,894	-,041	,307	-,658	,576
	Equal variances not assumed			-,120	21,367	,905	-,041	,342	-,751	,669
CorruptionAOV	Equal variances assumed	1,208	,277	,282	47	,779	,084	,299	-,517	,686
	Equal variances not assumed			,257	22,043	,800	,084	,328	-,596	,765

(t-test, indep. Samples, equal variances=0.724, df=47, p=.473).

### 12.4.2 Applicability Awarding on Value

#### 12.4.2.1 Attitudes towards organizational, national and global applicability of Awarding on Value

H10: Awarding on Value is applicable globally.

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ColleaguesAOV	Equal variances assumed	2,394	,129	1,125	47	,266	,296	,263	-,234	,826
	Equal variances not assumed			1,045	22,892	,307	,296	,283	-,290	,882
CountryAOV	Equal variances assumed	,707	,405	1,500	47	,140	,414	,276	-,141	,968
	Equal variances not assumed			1,434	24,288	,164	,414	,288	-,181	1,009
GloballyAOV	Equal variances assumed	1,316	,257	,402	47	,689	,120	,297	-,478	,717
	Equal variances not assumed			,371	22,504	,714	,120	,323	-,548	,788

(t-test, indep. Samples, equal variances=1.125, df=47, p=.266).

