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The Australian Academic and Research Network December 1989

ATTACHMENT B
WORKING DRAFT PAPER : F-11/12/89 AARNet Membership - Terms and Conditions

Attachment B: AARNet Membership - Terms and Conditions (Working Draft Paper)

COVER NOTE

This paper was prepared for the AARNet Steering Committee meeting, held on 14 December at the University of Sydney. The paper is included in this document for the purposes of providing information to all AARNet members as to the general intentions with respect to the proposed terms and conditions relating to connection to AARNet.

Please note that due to the time constraints in releasing this document immediately following this meeting, the views expressed within the AARNet Steering Committee with respect to this document have NOT been included in this draft. It is intended to pass this paper, along with the views of the AARNet Steering Committee to a Working Group for further consideration over January, and then to pass the resultant paper to the AARNet Board for consideration. In particular please note that there is NO commitment to the indicative connection fees indicated within this document.

This paper has been prepared over a number of months, and has taken input from initial drafts prepared by Mr C. Rusbridge of the AARNet Steering Committee and also included the views of other members of this committee. The paper also takes note of input received from the various Regional AARNet group meetings that have occurred through the year and also includes consideration of the views expressed at the recent National Network Workshop held in early December of this year. The paper also takes note of input from a number of organisations which have expressed a keen interest to join AARNet as affiliate members.

Following consideration of this paper by the AARNet Steering Committee at its December 1989 meeting, and further examination by an AARNet Working Group on 24 January 1990, it is the current intention to present this paper to the proposed AARNet Board for policy determination.

If you have comments regarding the matters covered within this paper, please forward them to the AARNet Network Technical Manager in the first instance (before 23 January), and they will be passed to the Working Group for consideration.

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Board of Aarnet

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In committing to provide services to the end users of each AARNet member and affiliate member site, the issue of the network path to the connected site is relevant.

It is proposed that AARNet provide the necessary infrastructure to directly connect to the institutional local area network of each member, and the location of this connection will be as nominated by the member or affiliate member.

3.1 Interface to AARNet

It is necessary to define the point of attachment between each member's local networking facilities and AARNet, in order to clearly delineate the respective areas of responsibility between AARNet and each member.

It is recommended that the interface from each member site to AARNet be the physical transceiver device on the member site's local area network. To ensure the effective operation of the equipment connected to this transceiver (the multi-protocol router equipment, line interface, the connecting link) and the network itself, it is proposed that the management of the equipment be the responsibility of AARNet.

This recommendation allows the AARNet Wide Area Network to be managed as a single entity, with AARNet taking the responsibility for the operational status of both the data communications link, and the link termination equipment to be installed on each site. Effectively this will allow:

- AARNet to directly meet the commitment of service provision to users by having direct control of all equipment in the path leading onto the central spine of each member's local network;
- uniform software upgrades to be performed on the routing equipment on a national scale;
- control of the routing information passed across the network to ensure maximal availability of the network from the perspective of the end-user;
- uniform resolution of operation problems with a national focus, ensuring that all AARNet equipment is configured optimally at all times.

It is recognised that this interface definition may entail additional expenditure on the part of some member sites: in a situation where the member site wishes to connect a number of locations using identical technology and equipment, the above proposal implies the institution spending an additional $15,000 in capital equipment costs to provide the equivalent functionality within the institution. However it should also be noted that the equipment to be purchased for AARNet has been selected using criteria as appropriate for Wide Area network performance: this equipment may not be the appropriate choice for Local Area networking applications in every case, as the performance parameters within the local context are somewhat different.

As an alternative to this additional expenditure, where a member site wishes to place additional interface equipment within the AARNet multi-protocol router to connect to other sites it is appropriate that the site make application to the AARNet Board for authority to so do. In so doing it will be required that the operational arrangements, which would then involve Regional Facilities Management and AARNet Operations Management as well as the member site, be agreed by all concerned. It is noted that in such cases, where there is "joint" management of the tail-end components of the network, AARNet's commitment of service provision to the member's user community is then more indirect.

Control of non affiliate non member users of hosts. — Obligation a host.

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3.2 Multiple Connections into AARNet

It is not envisaged that AARNet provide multiple connections to a single member or affiliate member. To do so AARNet would be placing itself within the additional role of service provider for internal network services for the institution, and the conflicting requirements of the management of the local institutional-based network and the broader national network are not considered a workable arrangement in general. However it is recognised that in some cases the level of autonomy of components of an institution is sufficiently great, and the relevant digital connection tariffs so structured, that additional links into AARNet from a single member is considered reasonable. It is intended that such situations be referred to the AARNet Board on a case-by-case basis for resolution. It is suggested that in cases where additional connections into AARNet are approved for a member site, the connecting site will fully fund both the costs of these additional links and the necessary equipment to be installed at both link ends, as well as the ongoing costs of maintenance.

3.3 Data Transmission link to AARNet

The preferred connectivity is one where each member site is directly connected by a single transmission link from the Regional hub to the central site of the connecting institution. In this way the responsibility for the provision of networking services is clearly an AARNet issue, involving AARNet communicating directly to the providers of both the equipment and the data transmission facilities in the event of network problems.

It is recognised that some sites may wish to place local circuit switching equipment within the total data path between the regional hub and the AARNet, or in some cases implement the link into AARNet by switching through an existing AARNet member in a chained topology.

This does present issues in terms of the direct relationship between AARNet and member sites, as the installation of additional equipment in the network connection to the site will entail more issues in problem resolution, and the overall evolution of the engineering of the network[1]. The general proposition is that all links to AARNet members be made by direct point-to-point connectivity from the member site to the Regional AARNet hub, but also included in this proposition is the provision for members to present a case to the AARNet Board in respect of implementing alternative arrangements.

4. AARNet Funding

4.1 Funding by AARNet Members

The funding model as proposed for AARNet for the first year of operation (1990) takes into account the necessary expenditure on capital equipment, data transmissions links, and the operational management overheads in running the network. The connectivity included in this budget includes direct links to each participating AARNet member.

The sources for funding for 1990 are:

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[1] For example, chained topologies present problems in determining the most cost effective method of direct bandwidth upgrades to indirectly connected member sites; without careful management attention to the growth of such connectivity models, the ability to manage the network as a single service provision entity is compromised and economies of scale of operation are reduced.

- The Australian Research Council
- AVCC and ACDP member institutions who are participating in AARNet
- CSIRO

In the case of CSIRO, central CSIRO administration is expected to provide $0.2m for each of 1990 and 1991 as CSIRO's component of the national and international expenditure for AARNet. Within each region CSIRO will fund the relevant proportion of the facilities management costs associated with the operation of this regional component of the network, and will pay the full costs in making a network connection from each nominated CSIRO site into AARNet[1].

In the case of AVCC and ACDP member institutions, the funding is based on the operating grant of each participating institution[2].

4.2 Funding by AARNet Affiliate Members

In determining the 1990 AARNet budget no provision has been made for any revenue raised by the charges levied in providing AARNet services to affiliate member institutions.

In providing data connectivity to affiliate members of AARNet, the issue of access charges is directly relevant. AARNet's objectives with such charges do not include the direct generation of profit from these activities[3], nor, on the other hand, should AARNet members be subsidising the use of the network by such non-member bodies.

The basis of the AARNet connection policy is therefore that connections by affiliate member bodies are to be encouraged, and also to ensure that non-members who do connect to AARNet pay the costs associated with their use of AARNet network services, and that such costs are used to offset the costs attributed to members of AARNet in the operation of the network[4] [5].

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[1] In most states a model involving a "primary" CSIRO site with direct connectivity to the Regional hub is proposed, and additional CSIRO links will be directed to this primary CSIRO site.

[2] While other funding mechanisms (such as usage based funding, or bandwidth-based funding) may prove to be viable in the longer term, the initial operation of AARNet is to be funded on the basis that an institution's operating grant is a suitable metric of anticipated actual network usage, and such a funding mechanism is equitable across all members of AVCC and ACDP.

[3] There is a distinction to be made here between the generation of a profit (in the commercial sense) and that of a revenue surplus. Certainly it is envisaged that there will be some form of revenue surplus gathered from such activities, to be used in providing funding for raising the quality and range of services provided on this network.

[4] The Steering Committee in considering this matter at earlier meetings had discussed an arrangement where those member bodies which provide network connections to non-member sites do so under financial arrangements as negotiated between the two parties involved in each case. Furthermore the major caveat that would be placed on such connections by AARNet is that the use of the network is for purposes of a non-commercial nature, and that such usage is related to the research, academic or professional activities of the network members.

[5] The arrangements as outlined in the above footnote make no provision for any payments into either the AARNet Regional Networks or the AARNet National Network. As a policy objective, the inclusion of a direct payment to the AARNet by the connecting body is considered desirable. Such payments can then be disbursed to both the Regional and National network budgets, ensuring that the costs incurred by those bodies providing services are covered by the payments made by the non-member user of the services.

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5. AARNet Affiliate Member Connection Charges

As with the AARNet members' funding formulae, the intent of this proposal is to nominate a relatively simple and uniform charging schedule for AARNet affiliate members.

Affiliate members pay a charging schedule which uses two components. The first of these addresses the costs involved in the provision of a point-to-point AARNet link from the Regional hub (or an AARNet member site under some circumstances) to the connecting site (the tail-end link). The second component addresses the charges incurred through usage of the network, both within AARNet itself, and the use of the international network links to access peer overseas networks of AARNet.

- It is proposed that the amount covering the tail-end link charges be negotiated by the host member site, and that this be a matter between the two parties concerned. Suggested guidelines for some link configurations are included in this document, but variations to these guidelines may be contemplated due to specific local considerations.

- The amount covering the costs of usage of AARNet national and international services be fixed by AARNet in all cases. The proposed schedule of charges are included in this document.

5.1 Guidelines for Tail-End Connection Charges for Affiliate Members

In providing Tail-End connections for affiliate members it is recommended that the connecting site be responsible for the purchase and installation of the link termination equipment on their site, and that the host institution be responsible for the termination of the other end of the communications link. It is also recommended that the responsibility for the costs of operation and maintenance of the link itself be that of the non-member connecting body.

The guidelines for charging are therefore intended to cover the local costs in the termination of the communications link, which are the purchase and maintenance costs of required equipment and operational costs.

It is assumed here that the link will be either an Internet Protocol (IP) link (using either the SLIP protocol over a low speed line, or intergateway protocols over a mid/high speed line), a DECnet link (most likely over an async 9.6K line), or a multi-protocol link using equipment functionally compatible with that used by the host member site.

The suggested guidelines are:

Equipment and Data Transmission

The connecting site funds the capital cost of the local equipment, the data transmission link, and all associated maintenance charges for these services and equipment.

Termination Equipment

9.6K SLIP or DECnet link	Connection fee	$1,000
	Annual Maintenance	$2,300 p.a.

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48K Multiprotocol link[1]	Connection fee	$5,000
	Annual Maintenance	$3,500 p.a.
10M link	Connection fee	$10,000
	Annual Maintenance	$7,000 p.a.

These charges are payable to the AARNet member site which terminates the tail end connection to the affiliate member site.

The connection fee covers the capital purchase of line termination equipment at the member site.

The annual maintenance fee covers the local expenditure in respect of facilities management of this additional equipment. Additionally this fee covers the overheads in terms of local maintenance activities associated with network connectivity to the connecting site, and also connectivity for the various network applications (mail, remote access, etc).

5.2 AARNet Connection Charges for Affiliate Members

In determining a schedule of charges for access to AARNet, the basis for the charge schedules is that of the effective bandwidth of the link between the connecting body and AARNet. The bandwidth is a simple metric of the potential usage of the network's services and the quality of the provision of that service. The charge is intended to cover the costs to AARNet in providing national and international network access to the connecting body.

The determination of these charges is based on cost estimates of $1 m p.a. for the operation of the national and international components of AARNet, funded by a pool of some 40 AARNet members and affiliate members, using 48Kbps bandwidth access links. This results in a charge of $25,000 p.a. for a 48Kbps connection. Charges for lower bandwidths are roughly proportional to this figure, and for higher bandwidths are discounted by the inability to use such bandwidths through the entire network.

The proposed schedule is therefore as follows:

AARNet annual usage charges:

Connection Bandwidth	AARNet fee
Dial-in SLIP / DECnet	$3,000
9.6K SLIP / DECnet	$6,000
19.2K	$12,000
48K (Multi Protocol)	$25,000
2Mbps	$50,000

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These fees are payable directly to AARNet.

[1] This assumes that the host site has a configurable Bridge/Router capable of adding further interfaces.

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ATTACHMENT A
WORKING DRAFT PAPER : 11/12/89 **AARNet Management**

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AARNet Management

1. General

With much of the planning activity relating to the implementation of the initial phase of the Australian Academic and Research Network (AARNet) drawing to a close, AARNet is now entering the second major phase of activity; the implementation of the network and the ongoing management of this service. This document describes the proposed management structure of AARNet for this phase of activity.

The objective of AARNet is the provision of networking services to all participating member institutions of the Australian Vice-Chancellors Committee(AVCC) and the Australian Committee of Directors and Principals, Limited (ACDP), together with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), for the support of their academic and research activities.

From 1 January 1991 the AVCC will be the peak body representing higher education institutions which are members of the Unified National system. In view of this change in representation and the strong research basis of its members, the AVCC is in the best position to be responsible for the implementation of AARNet.

While there is a considerable amount of cooperative effort involved between AVCC, ACDP and CSIRO in establishing AARNet, it is proposed that the AVCC be the initial owner. Despite this there is a need to ensure that CSIRO and (for 1990) ACDP are consulted and involved in any decisions taken on the future of AARNet.

The AVCC has determined that it is not appropriate to establish a separate and independent structure/company to establish and manage AARNet while recognising that it is essential that the current co-operative approach between AVCC, ACDP and CSIRO must be maintained.

Given CSIRO's special relationship to AARNet through its funding of approximately 20% of the estimated national and international components of AARNet, provision is to be made to ensure that CSIRO has appropriate representation on any management and technical structure established to administer AARNet.

The AVCC has agreed that it is appropriate to establish a joint AVCC/ACDP Standing Committee to be responsible for the development of policies and directions for the management of AARNet.

2. Parent Organisations.

As indicated above AARNet is being established under the aegis of the AVCC.

In providing this service to member organisations of the three bodies (AVCC, ACDP and CSIRO), it is recognised that this activity will entail the participation of the ACDP and CSIRO in defining specific objectives and resolving matters of policy concerning AARNet. Although in matters of ultimate responsibility for AARNet, including determination of policy, provision of service and funding, the AVCC is in the role of the major parent organisation. It is envisaged that where a decision is required of the AVCC that there will be appropriate consultation with ACDP and CSIRO prior to a decision being taken. This consultation will normally occur via the proposed AARNet Board.

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3. AARNet Board

In moving from planning and implementation to the operational phase of AARNet, it is considered necessary to reconsider the management structure for AARNet. For operational purposes it is considered that the effective management structure would consist of a small group (approximately 7 to 9 persons) responsible, on behalf of members of AARNet, for its operation.

It is proposed that a Board be established which would be responsible for the determination of relevant matters of policy associated with AARNet management, and for overseeing the activities of the AARNet as a whole. It is anticipated that the Board will meet on a quarterly basis, and submit formal reports to the parent organisations on a six monthly basis. To enable the successful commissioning of AARNet in 1990 it would be necessary for the first meeting to be held early in 1990 to review the implementation of AARNet and associated policy issues.

It is proposed that the membership of the Board reflect the interests of the parent organisations and the major funding sources. The following membership is proposed:

- 1 member of AVCC (chair)
- 1 nominee of the Australian Research Council (ARC)
- 1 nominee of CSIRO
- 3 nominees of AVCC
- 1 nominee of ACDP

To ensure the effective operation of the Board and its relationship with the operational areas of member institutions it will be essential to include representation on the Board from both the academic and operational service domains.

The AVCC Secretariat will be responsible for servicing the Board. The expenses of the Board are to be funded from the AARNet budget.

While the Board will be responsible for the determination of relevant AARNet policy, it will need to do so within the parameters set by the parent organisations.

4. AARNet Technical Working Groups

Technical Working Groups would be a resource at the National level intended to ensure appropriate expert technical input into the evolution of the provision of AARNet services to the ultimate end-user population. These working groups would be established as required by the Board. Such groups would report and provide advice to the AARNet Board as to the optimal directions of the AARNet network architecture, the evolving use of networking technology and the provision of new and altered networking services to meet end user requirements.

Members of these groups would be drawn from those members of the Australian Academic and Research community with a recognised outstanding level of technical expertise and experience in computer networking.

All major proposals relating to the technical aspects of the network (digital transmission link technologies, networking protocols, technical aspects of the provision of networking services, directions for network management technologies) are likely to be referred by the AARNet Board to a working group for advice.

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5. Regional Network Groups

The inclusion of Regional Network Groups within each State is intended to provide a structural hierarchy within AARNet to ensure that the overall technical and managerial tasks associated with AARNet can be correctly addressed at both the national level (in defining the common set of provided services which define the AARNet network), and at the regional level (ensuring that local knowledge and resources can be employed) to ensure that AARNet implements the most cost effective solutions in connecting each member site to the network. As the major guiding principle lies in the provision of common networking services to every AARNet member institution, this implies a very high degree of open peer cooperative effort between each regional Network and the national AARNet bodies.

The AARNet structure which has been implemented within each State is that of a technical-oriented group with members (typically local Network Managers) drawn from each AARNet member site. These groups employ an open structure which include standing invitations to interested academic and researchers to attend, enabling these groups to be an open forum for the formulation of the most effective mechanisms of service delivery to end-users.

These Regional groups are intended to provide detailed input concerning the installation and subsequent operational activities of AARNet, and upon request, to provide advice to the AARNet Board from a Regional perspective on technical matters relating to the services provided by AARNet.

The actions performed by these groups are:

- to participate in the engineering effort of the network, to enable AARNet member organisations to be provided with AARNet services at the most cost effective levels;
- to provide input into the overall planning activity concerning the directions of the AARNet facility.

The commitment of AARNet is to the provision of networking services to each member site[1]. It is recognised that some Regional Networks have indicated their intention to augment these national services with the provision of additional data communications services and/or information and consultative services within the State[2].

In implementing such additional services over the common AARNet environment at a regional level, the Regional Network may wish to create a formal Regional Management structure to manage both the provision of these value added services and any associated funding drawn from each member subscribing to these value-added services.

The responsibilities of such Regional management groups are envisaged to be concerned with:

- the management of the delivery of Regional value-added networking services to member sites within the region;

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1 This service is the provision of a data communications link into the National network and peer international networks using a multi-protocol router interface at each member site.

2 The Queensland Regional Network has proposed the integration of the existing private X.25 Queensland network (QTInet) with the AARNet services within that State. The regional network group of New South Wales is currently considering the provision of an information centre within that State to provide a "help desk" intended to provide information services relating to the network and the layered user level applications which will be used on AARNet.

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- to participate in the activities of any related State-based data communications initiatives in order to provide additional services to Regional AARNet members.

- to provide responses to requests from the AARNet Board on Regional network activities;

Members of the Regional Network will be responsible for the establishment and ongoing financing of such groups.

6. AARNet Operations Section

It is proposed that this area of support be provided by an AARNet section within the AVCC Secretariat, reporting to the AARNet Board through the Deputy Secretary of the AVCC.

It is proposed that this section be responsible for two broad areas of activity: that of technical operational management of the network and that of business management within the policies determined by the AARNet Board.

6.1 AARNet Technical Operations Management

Within the role of technical operations management of AARNet, the activities which would be performed by this section include the engineering of the domestic and international links, the configuration of network switching equipment throughout AARNet, the management of network services provided on a national basis, and the management of the introduction of additional services on the network as required by end-user and technical considerations.

It is proposed that this section also will fulfil the role of the National AARNet Operations Centre support, in operating equipment which will monitor the operational status of all AARNet links and equipment, and will coordinate the response to equipment or link failure of AARNet. Additionally all AARNet equipment will be monitored by this section to collect usage statistics on both link utilization and application based usage.

To date the role of Technical Manager has been performed by an AVCC staff member seconded from within the AARNet membership for a fixed initial period. A second technical position has been advertised and will be filled shortly under similar conditions, reporting to the Technical Manager position. At present this group is hosted within a member institution, and it is recommended that this arrangement be continued.

While the Technical activity is being hosted within a member site, there is no foreseen requirement for the Technical Operations Management section to grow beyond two members within the next 12 months. It is considered that within the overall management structure as proposed in this paper, this technical operations section, together with the facilities management contracts as arranged with the regional hub host institutions, that this total technical support structure provides adequate support mechanisms.

6.2 AARNet Business Management

The second role for the AARNet Operations Section is that of business management. The areas of activity of this group include management of the AARNet budget, payment of AARNet invoices and the billing of AARNet members and affiliate members for AARNet fees.

It is proposed that this area also involves the registration of affiliate network members for the Regional Networks, ensuring that all affiliate members connected into Regional Networks contribute to the overall

AARNet funding as per the national connection fee schedule to cover regional, national and international network expenditure.

Business management activities of this section would also include the provision of secretarial support for the AARNet Board and the AARNet Working Groups.

It is proposed that the AVCC Secretariat create the position of AARNet Business Manager, employed as an AVCC staff member to fulfil this function.

In terms of the relationship between these two sections it is recommended that the positions of Network Technical Manager and AARNet Business Manager be peer positions, both reporting through the AVCC staff structure to the Deputy Secretary of the AVCC. It is proposed that these officers would attend AARNet Board meetings by standing invitation. This peer arrangement is necessitated due to the primarily technical nature of the activity - the business management functions are a component of the mechanisms required to support the supply of the technology to each member organisation.

7. AARNet Operational Management

In terms of operational management of AARNet, overall operational management responsibility rests with the AARNet Section of the AVCC Secretariat operating under the direction of the AARNet Board. This section, in undertaking these responsibilities, will utilize the resources of the host sites of the regional network hubs to provide local facilities management of equipment. Each regional Network Hub host site has already been approached on this matter by the AVCC and has responded with their undertaking to provide local facilities management as a contract between the site and the AARNet. This activity is to be funded from the AARNet budget to the levels already agreed with each site.

These contracts cover the regional hub sites in each State and also cover the national hub site located at the University of Melbourne. The responsibilities of the facilities management site are to perform facilities management for the local hub equipment, including calling service organisations in the event of equipment failure, and contacting Telecom in the event of data link failure. The hub site will also be responsible for initial fault determination with respect to link termination equipment at each member site, and will place the service call as required for the remote equipment.

At the institutional level the network connection is that of an Ethernet connection to the AARNet interface equipment. AARNet will purchase the interface equipment as well as the necessary adaptors to connect to the local Ethernet segment. It is the responsibility of the local site to provide power to the equipment, and to promptly notify the Regional Facilities Operations contact in the event of equipment failure. Equipment maintenance will be performed under a national AARNet maintenance contract, and the site will work with the Regional Facilities Operations centre in notifying faults to the appropriate service contact.

It is not considered a feasible option to allow the local site to use this link interface equipment to interface to multiple local network segments: the consequent differing operational and managerial requirements of the Local network services as against AARNet requirements are considered to be a major source of operational problems in such a case. This clear physical, operational and managerial delineation between the AARNet interface to the organisation and the local area network within the organisation allows each site to engineer their local network without the constraints of working within the operational and managerial requirements of AARNet. There is no requirement for the local network to use identical equipment to that employed in AARNet, and in many cases other approaches in addressing local network requirements will prove more effective for the organisation.