Τεχνολογικό Εκπαιδευτικό Ίδρυμα Καλαμάτας
Τμήμα Διοίκηση Μονάδων Υγείας Πρόνοιας

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«Ανάλυση χαρτοφυλακίου σε οργανισμούς υγείας: Μια εφαρμογή στη διαδικασία στρατηγικής διοίκησης στο Πανεπιστημιακό Νοσοκομείο Μάαστριχτ, Κάτω Χώρες»

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Περίληψη:

Η ανάλυση χαρτοφυλακίου είναι ένα χρήσιμο εργαλείο διοίκησης που μπορεί να βοηθήσει τους διοικούντες τα νοσοκομεία στην ανάπτυξη νέων στρατηγικών οργάνωσης. Οι προϋποθέσεις για την εφαρμογή της ανάλυσης χαρτοφυλακίου σε νοσοκομειακά ιδρύματα δημιουργούνται από το συνεχώς εναλλασσόμενο περιβάλλον ιατρικής περίθαλψης και τους περίπλοκους διοικητικούς σκοπούς αποτελεσματικότητας και αποδοτικότητας. Αυτή η εργασία παρουσιάζει μια εφαρμογή της ανάλυσης χαρτοφυλακίου στην όλη διαδικασία στρατηγικής διοίκησης στο Πανεπιστημιακό Νοσοκομείο του Μάαστριχτ (συντομογραφία στα ολλανδικά: AZM). Η εργασία, εν συντομία, επικεντρώνεται στη φύση της ανάλυσης χαρτοφυλακίου, τη δυνατότητα εφαρμογής της ανάλυσης στον τομέα της ιατρικής περίθαλψης και στα διάφορα μοντέλα χαρτοφυλακίου. Με βάση την υπάρχουσα σχετική βιβλιογραφία και τα χαρακτηριστικά του διερευνόμενου περιβάλλοντος, ένα μοντέλο χαρτοφυλακίου για το AZM αναπτύσσεται και εφαρμόζεται.

Το μοντέλο χαρτοφυλακίου εφαρμόζεται ώστε να αναλύσει την ελκυστικότητα της αγοράς και τις δυνατότητες του νοσοκομείου σε σχέση με την παροχή τριών ορθοπεδικών υπηρεσιών: την επέμβαση γονάτου, την επέμβαση γοφού και την αρθροσκόπηση. Η σύγκριση των αποτελεσμάτων για τις τρεις υπηρεσίες δείχνει ότι οι υπηρεσίες επέμβασης γονάτου και γοφού είναι πιο ελκυστικές για το νοσοκομείο, σε σύγκριση με την αρθροσκόπηση.

Τα αποτελέσματα είναι ιδιαίτερα χρήσιμα για την άντληση συμπερασμάτων σχετικών με τα πλεονεκτήματα και τους περιορισμούς της ανάλυσης χαρτοφυλακίου σε ένα δημόσιο νοσοκομείο.

1. Εισαγωγή:

Παραδοσιακά, τα δημόσια νοσοκομεία της Ευρώπης επιχορηγούνταν και διοικούνταν, κατά κύριο λόγο, από κυβερνητικά ιδρύματα. Το αντικείμενο του κέρδους ήταν σπάνια μέρος των ενδιαφερόντων τους. Δεν υπήρχε λόγος, για τους οργανισμούς αυτούς, να συναγωνιστούν για επιχορηγήσεις και να αναπτύξουν ένα λεπτομερές λογιστικό

πληροφοριακό σύστημα, αφού το κόστος δεν υπήρξε ποτέ θέμα προβληματισμού. Ωστόσο, ο αντικειμενικός σκοπός των κυβερνήσεων να ελέγχουν τα ολικά έξοδα για ιατρική περίθαλψη και να βελτιώσουν την αποδοτικότητα στην κατανομή πόρων, επέφερε μεγάλες μεταρρυθμίσεις στην ιατρική περίθαλψη. Ως αποτέλεσμα, οι μέθοδοι επιχορήγησης νοσοκομείων τροποποιήθηκαν αισθητά και το μέγεθος των κυβερνητικών επιχορηγήσεων σε ιδρύματα ιατρικής περίθαλψης περιορίστηκε. Αυτό, δημιούργησε μια αξιοσημείωτη οικονομική πίεση για πολλά δημόσια νοσοκομεία, ιδίως όταν η εσωτερική τους δομή δεν μπόρεσε να προσαρμοστεί με τις νέες προκλήσεις (Kemenade, 1997; Waters and Hussey, 2004;).

Ο στόχος της μείωσης του κόστους σε συνδυασμό με την γήρανση του πληθυσμού, τις αυξανόμενες προσδοκίες του καταναλωτή, και μια αυξανόμενη πίστη στον μηχανισμό αγοράς έχουν καταστήσει αναγκαία την χρήση προηγμένων συστημάτων σχεδιασμού που λαμβάνουν υπόψη τους τόσο το εσωτερικό όσο και το εξωτερικό περιβάλλον του νοσοκομείου. Για αυτό το λόγο, οι προσεγγίσεις του στρατηγικού μάνατζμεντ που εφαρμόζονται στον δημόσιο τομέα, ελκύουν και τους μάνατζερ των νοσοκομείων. Παρόλα αυτά, πολλά δημόσια νοσοκομεία συνεχίζουν να εμπιστεύονται τα παραδοσιακά πρότυπα σχεδιασμού που εστιάζουν μόνο στους εσωτερικούς παράγοντες διοίκησης. Αν και αυτές οι μέθοδοι αποδείχτηκαν να είναι λιγότερο ελαστικές στην υποστήριξη του μάνατζμεντ σε ένα δυναμικό περιβάλλον αγοράς, η έλλειψη επαρκών στοιχείων και προοδευτικής σκέψης μάνατζμεντ συχνά προβάλουν εμπόδια στην τροποποίηση τους. Τα δημόσια νοσοκομεία με ανεπαρκή συστήματα σχεδιασμού μπορούν τελικά να αντιμετωπίσουν προβλήματα στην οικονομική τους επίδοση πραγματοποιώντας περιττά έξοδα. Με την αυξανόμενη αυτονομία των νοσοκομείων και τη δυνατότητα αυτοχρηματοδότησής τους, η υιοθέτηση των στρατηγικών τεχνικών μάνατζμεντ από δημόσια νοσοκομεία δείχνει να σχετίζεται άμεσα με την επιβίωσή τους (Dunkan et al., 1998;)

Το στρατηγικό μάνατζμεντ μπορεί να παρέχει μια φιλοσοφία μάνατζμεντ των οργανισμών παροχής ιατρικής περίθαλψης. Μπορεί να προσφέρει ένα πλαίσιο εργασίας για μια αποδοτική λειτουργία των οργανισμών αυτών βασισμένο στις δυνατότητες οργάνωσης. Οι βασικές αρχές του στρατηγικού μάνατζμεντ προέρχονται από την ιδέα ότι ένας οργανισμός πρέπει συνέχεια να παρακολουθεί τις τάσεις στο εσωτερικό και

εξωτερικό περιβάλλον του για να μπορεί να αναπτυχθεί με έναν αποτελεσματικό και αποδοτικό τρόπο (Dunkan et al., 1998). Αυτή η άποψη δίνει στους μάνατζερ την ευκαιρία να αντιδράσουν έγκαιρα και αποτελεσματικά σε αλλαγές που αντιμετωπίζουν οι οργανισμοί τους. Η υιοθέτηση στρατηγικών τεχνικών μάνατζμεντ ωστόσο, δεν μπορούν να εγγυηθούν την βραχυπρόθεσμη επιτυχία στην λειτουργία ενός οργανισμού. Το στρατηγικό μάνατζμεντ έχει μακροπρόθεσμο προσανατολισμό. Συνήθως απαιτείται κάποιος χρόνος πριν το στρατηγικό μάνατζμεντ γίνει μέρος της διοικητικής κουλτούρας και οδηγήσει στις επιθυμητές βελτιώσεις. Για τον ίδιο λόγο, το στρατηγικό μάνατζμεντ δεν μπορεί από μόνο του να προσφέρει λύση σε προβλήματα που σχετίζονται με την καθημερινή λειτουργία και δεν μπορεί να είναι η απάντηση για οργανισμούς που αντιμετωπίζουν πρόβλημα επιβίωσης. Σκοπός του είναι πρωταρχικά να αναδείξει πτυχές που πιθανόν να είναι σημαντικές για την οργάνωση στο μέλλον και να διασφαλίσει την μακροπρόθεσμη επιβίωση του οργανισμού.

Οι διοικητές νοσοκομείων στρέφονται, όλο και πιο συχνά, σε τεχνικές στρατηγικού μάνατζμεντ που χρησιμοποιούνται κατά κόρον στην οργάνωση και λειτουργία παραγωγικών μονάδων. Αυτό δεν προκαλεί έκπληξη, αφού οι στόχοι μιας εταιρείας για μείωση κόστους, αύξηση κερδών και οικονομική σταθερότητα γίνονται σημαντικά και για τους φορείς που ασχολούνται με την παροχή ιατρικής περίθαλψης. Μία από τις τεχνικές που χρησιμοποιούν μεγάλες εταιρείες και που οι μάνατζερ νοσοκομείων έχουν ήδη υιοθετήσει για να κατηγοριοποιήσουν τις υπηρεσίες που προσφέρουν τα νοσοκομεία και να καθορίσουν ένα βέλτιστο συνδυασμό υπηρεσιών, είναι η ανάλυση χαρτοφυλακίου (Walker and Rosco, 1998). Η εφαρμογή της ανάλυσης χαρτοφυλακίου σε νοσοκομειακούς οργανισμούς στις Η.Π.Α. έχει αναφερθεί συχνά από την δεκαετία του 1980 (Bare and Bess, 1990; Craig, 2001; Drain and Godkin, 1996; Hamilton and Zuckerman, 1998; McCain, 1987; Meeks et al., 1999; Walker and Rosco, 1988; Zallocco et al., 1984). Στην Ευρώπη, ωστόσο, λίγη προσοχή έχει αποδοθεί στη μέθοδο αυτή.

Η παρούσα εργασία παρουσιάζει μια εφαρμογή της ανάλυσης χαρτοφυλακίου, σε ένα γνήσιο ευρωπαϊκό νοσοκομειακό οργανισμό. Ειδικότερα, εξετάζονται οι ιδιαιτερότητες της ανάλυσης χαρτοφυλακίου και η εφαρμογή της στη διαδικασία στρατηγικού μάνατζμεντ στο Ακαδημαϊκό Νοσοκομείο του Μάαστριχτ στην Ολλανδία.

Για να επιτευχθεί αυτός ο στόχος, χρησιμοποιείται μια ποσοτική ερευνητική προσέγγιση. Συγκεκριμένα, με τη χρήση λογιστικών δεδομένων διαθεσίμων από τους ελεγκτές του νοσοκομείου, και των αποτελεσμάτων μιας έρευνας ανάμεσα στους εργαζόμενους του νοσοκομείου, αναπτύχθηκε και αναλύθηκε ένας πίνακας χαρτοφυλακίου (portfolio matrix).

Στην εργασία περιγράφεται η μεθοδολογία της ανάλυσης χαρτοφυλακίου, η λειτουργικότητα του μοντέλου χαρτοφυλακίου και η διαδικασία συλλογής δεδομένων. Στη συνέχεια παρουσιάζονται τα κυρίως αποτελέσματα της έρευνας και η ερμηνεία τους καθώς και τα συμπεράσματα σχετικά με τα πλεονεκτήματα και τους περιορισμούς της ανάλυσης χαρτοφυλακίου.

2. Το πλαίσιο εργασίας της ανάλυσης χαρτοφυλακίου

Οι όροι χαρτοφυλάκιο και ανάλυση χαρτοφυλακίου έχουν χρησιμοποιηθεί με διαφορετικό νόημα ανάλογα με το αντικείμενο του τομέα εφαρμογής τους. Στον τομέα της εταιρικής χρηματοδότησης, η ανάλυση χαρτοφυλακίου είναι μια ανάλυση των συνδυασμένων επενδύσεων που ελέγχονται από μια οργάνωση. Ο σκοπός της είναι να αναπτύξει μια αποδεκτή επένδυση και μια στρατηγική διαχείρισης κινδύνου δεδομένου του χαρτοφυλακίου επένδυσης της οργανισμού. Στην εκπαίδευση, η ανάλυση χαρτοφυλακίου, που περιγράφει ατομικά επιτεύγματα μάθησης, έχει διάφορους στόχους συμπεριλαμβανομένου την επικύρωση προηγούμενης εμπειρίας, έρευνα, συνεχόμενη επαγγελματική ανάπτυξη και πιστοποίηση ικανοτήτων. Ο όρος χαρτοφυλάκιο χρησιμοποιείται στην πολιτική για να περιγράψει το κυβερνητικό γραφείο ή τις ευθύνες κάποιου υπουργού.

Στο στρατηγικό μάνατζμεντ και μάρκετινγκ, τα οποία είναι το αντικείμενο αυτής της εργασίας, ένα χαρτοφυλάκιο παρουσιάζει μια συλλογή ήδη υπαρχόντων ή μελλοντικών προϊόντων (συμπεριλαμβανομένων υπηρεσιών και προγραμμάτων), που προσφέρονται από έναν οργανισμό. Η ανάλυση του χρησιμεύει ως εργαλείο ταξινόμησης αυτών των προϊόντων σε κατηγορίες βασιζόμενες σε εσωτερικά και εξωτερικά κριτήρια (Bare and Bess, 1990; Walker and Rosco, 1988). Το κάθε προϊόν επιλέγεται βάσει της οικονομικής του παρουσίασης και οργανωτικής του σχετικότητας. Ένα μοντέλο

καθορισμού αποφάσεων κατηγοριοποιεί τα προϊόντα και δίνει την δυνατότητα στους διοικητές ενός νοσοκομείου να καθορίζουν μελλοντικές στρατηγικές. Η ανάλυση χαρτοφυλακίου βασίζεται στις παρακάτω κύριες υποθέσεις. Δέχεται ότι ένας οργανισμός είναι μία δομή από μονάδες και η κάθε μονάδα λειτουργεί σύμφωνα με το πολιτικό, οικονομικό, δημογραφικό, τεχνολογικό και κοινωνικό περιβάλλον. Κάθε μονάδα υπόκειται σε αλλαγές και ελέγχους ανεξάρτητα από άλλες μονάδες του οργανισμού. Η διοίκηση στηρίζεται στη λήψη συγκεκριμένων αποφάσεων σχετικά με κάθε μονάδα και όχι στην λήψη οργανωτικών αποφάσεων που αφορούν τις μονάδες ως σύνολο. Η θέση του οργανισμού στο εξωτερικό περιβάλλον, δεν αντανακλά αναγκαστικά και τη θέση των ατομικών μονάδων που τον αποτελούν, αλλά η θέση αυτή εξαρτάται από τα χαρακτηριστικά του οργανισμού ως σύνολο (Bess, 1990).

Η ανάλυση χαρτοφυλακίου αποτελείται από πέντε βασικά βήματα (Zallocco, 1984; Rosco, 1988):

α) *Ορισμός Προϊόντος*, ο οποίος στοχεύει στο να αναγνωρίσει και να προσδιορίσει τα προϊόντα που μπορούν να συμπεριληφθούν στην ανάλυση χαρτοφυλακίου. Όταν η ανάλυση αφορά μια μεγάλη ποικιλία προϊόντων, είναι αναγκαίο πρώτα να γίνει ομαδοποίηση των προϊόντων, βάση της ιδιαιτερότητάς τους, και κατόπιν να δημιουργηθεί η τελική λίστα διακριτών προϊόντων.

β) *Επιλογή κριτηρίων* για την αξιολόγηση των προϊόντων του χαρτοφυλακίου. Αυτό ίσως να είναι το πιο σημαντικό βήμα στην ανάλυση χαρτοφυλακίου. Αν η αξιολόγηση των κριτηρίων δεν είναι κατάλληλη, οι μάνατζερ μπορεί να οδηγηθούν σε λανθασμένα συμπεράσματα και να καταλήξουν στην επιλογή αναποτελεσματικής στρατηγικής.

γ) *Ανάλυση* του περιβάλλοντος στο οποίο το νοσοκομείο λειτουργεί. Ανάλυση του εξωτερικού περιβάλλοντος δηλ. των εξωτερικών παραγόντων (π.χ. ανταγωνιστικές τάσεις, τεχνολογικές αλλαγές, επίπεδα ζήτησης και οικονομικές αλλαγές) όπως επίσης και ανάλυση της θέσης του προϊόντος που περιλαμβάνεται στο χαρτοφυλάκιο σε σχέση με το περιβάλλον αυτό.

δ) *Επιλογή και λειτουργικότητα ενός μοντέλου χαρτοφυλακίου.* Στην έρευνα για ένα κατάλληλο μοντέλο χαρτοφυλακίου, γραφεία συμβούλων, διαφημιστικές εταιρείες και πανεπιστήμια ανέπτυξαν διάφορες αναλυτικές προσεγγίσεις βασισμένες στην φιλοσοφία του εφαρμοσμένου μάνατζμεντ και στα χαρακτηριστικά του εξωτερικού περιβάλλοντος.

Η προετοιμασία του προϊόντος χαρτοφυλακίου σε ένα οργανισμό μπορεί να βασίζεται στην προσαρμογή ενός υπάρχοντος αναλυτικού μοντέλου ή στην ανάπτυξη ενός νέου. Τα βασικά μοντέλα χαρτοφυλακίου και οι περιγραφές τους παρουσιάζονται στον πίνακα 1.

ε) *Ανάπτυξη μελλοντικών στρατηγικών* σε σχέση με την κατανομή πόρων, την απόκτηση επιπλέον πόρων, την προώθηση νέων προϊόντων και την πολιτική τιμών. Στόχος είναι να χρησιμοποιηθούν τα αποτελέσματα χαρτοφυλακίου για να αναπτύξουμε ένα ικανοποιητικό κείμενο-οδηγό για την λήψη αποφάσεων μάνατζμεντ.

Έχοντας αναφέρει τα κύρια χαρακτηριστικά των μοντέλων χαρτοφυλακίου στον πίνακα 1, και με στόχο την απλότητα αλλά και την αποτελεσματικότητα, επιλέχτηκε το GE multifactor matrix (GE πολυπαραγωντικός πίνακας) ως αναλυτικό πλαίσιο εργασίας σε αυτήν την έρευνα. Το μοντέλο multifactor matrix παρέχει μια συστηματική προσέγγιση στην αποτίμηση των υπαρχόντων και μελλοντικών προϊόντων, υπηρεσιών, προγραμμάτων, τμημάτων ή άλλων στρατηγικών επιχειρησιακών μονάδων που αποτελούν το οργανωτικό χαρτοφυλάκιο. Τα προϊόντα χαρτοφυλακίου αποτιμούνται λαμβάνοντας υπόψη τις δυνατότητες του νοσοκομείου και την ελκυστικότητα της αγοράς στην παροχή ενός συγκεκριμένου προϊόντος. Μέσα σε αυτές τις δύο γενικές διαστάσεις, επιλέγονται και αναλύονται αρκετά συγκεκριμένα κριτήρια επίδοσης. Οι αξίες των κριτηρίων υπολογίζονται και μετριόνται ανάλογα με την σπουδαιότητα για το κάθε αντικείμενο στο προϊόν χαρτοφυλακίου. Σύμφωνα με αυτές τις αξίες, εκτιμούνται τα συνολικά σκορ των δυνατοτήτων του νοσοκομείου και της ελκυστικότητας της αγοράς που αφορούν ένα συγκεκριμένο προϊόν χαρτοφυλακίου. Τα προϊόντα χαρτοφυλακίου τότε προσδιορίζονται σε ένα πλέγμα που ονομάζεται multifactor matrix (πολυπαραγωντικός πίνακας)(βλ. εικόνα 1).

Ο άξονας y του matrix αντιπροσωπεύει το συνολικό σκορ όσον αφορά τις δυνατότητες του νοσοκομείου και ο άξονας x δείχνει το συνολικό σκορ όσον αφορά την ελκυστικότητα της αγοράς. Ο κάθε άξονας χωρίζεται σε τρία ίσα επίπεδα. Για τις δυνατότητες νοσοκομείου τα επίπεδα είναι: υψηλό, μέτριο και χαμηλό, και για την ελκυστικότητα της αγοράς: δυνατό, μέτριο και αδύναμο. Ο συνδυασμός των επιπέδων των αξόνων καταλήγει σε εννιά διαφορετικά κελιά, τα οποία χαρακτηρίζουν ένα συγκεκριμένο επίπεδο δυνατοτήτων οργανισμού και ελκυστικότητας αγοράς. Έχοντας

δώσει τα συνολικά σκορ, ένα προϊόν τοποθετείται σε ένα κελί του πίνακα και η θέση του αμέσως υποδεικνύει μια στρατηγική μάνατζμεντ.

Τα προϊόντα στη ζώνη των πιο ευνοϊκών κελιών (τα τρία κελιά στην επάνω αριστερά γωνία του πίνακα στην εικόνα 1) είναι ελκυστικοί υποψήφιοι για ανάπτυξη. Η στρατηγική μάνατζμεντ που σχετίζεται με αυτά τα προϊόντα συχνά ονομάζεται cost leadership, η οποία υποδηλώνει τυποποίηση που ακολουθείται από μία αύξηση στις ποσότητες που παρέχονται. Όταν τα προϊόντα τοποθετούνται στην μέτρια ζώνη (στον πίνακα 1, τα τρία κελιά στον διαγώνιο άξονα) οι κατάλληλες στρατηγικές μάνατζμεντ είναι είτε συντήρηση ή συγκομιδή. Τα προϊόντα θα πρέπει να διαφοροποιούνται από παρόμοια προϊόντα και η μοναδικότητα τους θα πρέπει να παρέχεται (τονίζεται;;) μέσα από τα χαρακτηριστικά προϊόντων, υπηρεσιών, κτιρίων, διαφήμισης, εμφάνισης ή εικόνας του ιδρύματος. Τα προϊόντα που σχετίζονται με την πιο αδύναμη ζώνη (τα τρία κελιά στην κάτω δεξιά γωνία του πίνακα στην εικόνα 1) απαιτούν την εστίαση των μάνατζερ για να αποφασίσουν εάν θα αναπτύξουν ή θα τερματίσουν την παροχή του προϊόντος. Από αυτήν την άποψη, οι προσπάθειες των μάνατζερ θα έπρεπε να επικεντρώνονται στον να βρουν μια μοναδική θέση αγοράς για κάθε προϊόν ώστε να βελτιωθεί η γενική του θέση (Zallocco et al., 1984).

Για να εφαρμοστεί το μοντέλο multifactor matrix (πολυπαραγοντικός πίνακας), είναι αναγκαίο να γίνει η υπόθεση ότι η ελκυστικότητα της αγοράς και οι δυνατότητες του νοσοκομείου είναι αναγνωρίσιμες και μπορούν να καθοριστούν, είτε ποσοτικά, είτε ποιοτικά. Όταν συγκρίνεται μία ομάδα με ποικίλα προϊόντα (π.χ. μαιευτική και πλαστική χειρουργική), πρέπει να αναγνωριστούν τα κοινά χαρακτηριστικά των προϊόντων για να επιλεχτούν και να τεθούν σε λειτουργία τα κριτήρια αποτίμησης. Η ανάλυση μπορεί να γίνει σε διάφορα επίπεδα του οργανισμού, από τα τμήματα μέσα σε έναν οργανισμό μέχρι και σε συγκεκριμένα προϊόντα μέσα σε έναν οργανισμό. Ωστόσο, η ανάπτυξη των μελλοντικών στρατηγικών μάνατζμεντ μπορεί να γίνει πιο αποτελεσματική όταν αναλυθούν ατομικά προϊόντα (Zallocco et al., 1984).

Το μοντέλο (πολυπαραγοντικός πίνακας) multifactor matrix εμφανίζεται να είναι ιδιαιτέρως κατάλληλο για την ανάλυση ενός νοσοκομειακού χαρτοφυλακίου κλινικών υπηρεσιών ή προγραμμάτων, καθώς επίσης και για την αποτίμηση νέων ευκαιριών σε έναν νοσοκομειακό οργανισμό. Το μοντέλο επιτρέπει την χρήση πολλαπλών κριτηρίων

αποτίμησης, προσαρμοσμένων στις μοναδικές ανάγκες του οργανισμού και στην αγορά ιατρικής περίθαλψης. Ως αποτέλεσμα, μπορεί να δημιουργηθεί μια περιεκτική εικόνα των συγκεκριμένων διοικητικών προβλημάτων. Ωστόσο, η εφαρμογή του μοντέλου μπορεί να είναι μάλλον ευάλωτη σε σχέση με την επιλογή κριτηρίων. Για να αποφευχθούν τέτοιες τάσεις, τα κριτήρια που ενισχύουν προκαθορισμένες αποφάσεις, θα έπρεπε να αποκλειστούν, ακόμα κι αν είναι σημαντικά. Τα πιο ενδιαφέροντα ερωτήματα σχετικά με την εφαρμογή του μοντέλου (πολυπαραγοντικός πίνακας) multifactor matrix μπορούν να συνοψιστούν ως:

- Πώς να αναγνωριστούν σχετικά κριτήρια αποτίμησης;
- Πώς να τεθούν σε λειτουργία αυτά τα κριτήρια;
- Πώς να μετρηθεί η σημαντικότητα των κριτηρίων;
- Πώς να μετρηθούν οι αξίες των κριτηρίων όταν υπολογίζονται τα συνολικά σκορ;

Οι απαντήσεις σε αυτά τα ερωτήματα απαιτούν μία σε βάθος ανάλυση του οργανισμού όπου το μοντέλο χαρτοφυλακίου αναπτύσσεται και των χαρακτηριστικών των συγκεκριμένων προϊόντων που εμπλέκονται στο μοντέλο. Πρέπει να ληφθεί υπόψη τόσο το εξωτερικό όσο και το εσωτερικό περιβάλλον του οργανισμού.

3. Ερευνητικό περιβάλλον

Για να εξεταστεί η εφαρμογή ενός μοντέλου multifactor matrix σε ένα δημόσιο νοσοκομείο, το πανεπιστημιακό νοσοκομείο του Μάαστριχτ (σύντμηση στα ολλανδικά: AZM) χρησιμοποιείται ως ερευνητικό περιβάλλον. Στο ρόλο του πανεπιστημιακού νοσοκομείου περιλαμβάνεται η προώθηση ιατρικής περίθαλψης καθώς επίσης και η εκπαίδευση και έρευνα. Το AZM παρέχει ουσιαστικά όλες τις ιατρικές ειδικότητες/ υποειδικότητες και γενικότερα ένα πλήρες φάσμα νοσοκομειακής περίθαλψης στους ασθενείς της περιοχής του Μάαστριχτ. Το νοσοκομείο παρέχει κορυφαία ιατρική περίθαλψη, προηγμένες κλινικές υπηρεσίες, εξειδικευμένα διαγνωστικά μηχανήματα και

θεραπείες. Επομένως, η κάλυψη πληθυσμού στο AZM επεκτείνεται περαιτέρω από την περιοχή του Μάαστριχτ.

Η διοικητική δομή του AZM περιλαμβάνει το διοικητικό συμβούλιο και τα υποσυστήματα διοίκησης των ιατρικών μονάδων (TCU). Μία φορά το χρόνο, το διοικητικό συμβούλιο παρουσιάζει μια περίληψη του οράματος, του σχεδιαγράμματος, και των νοσοκομειακών στόχων. Οι ιατρικές δραστηριότητες μέσα σε κάθε μονάδα προγραμματίζονται και προϋπολογίζονται σύμφωνα με αυτήν την περίληψη. Η διαχείρισή τους απαιτεί τη συναίνεση και των δύο, του ιατρικού ειδικού που διευθύνει τις ιατρικές δραστηριότητες στη μονάδα, και την non-medical εκτελεστική μονάδα που ονομάζεται αναπληρωτής διευθυντής.

Η χρηματοδότηση της φροντίδας ασθενών που το AZM παρέχει, προέρχεται από τις ασφαλιστικές εταιρείες σύμφωνα με την κυβερνητική νομοθεσία, καθώς επίσης και από το ολλανδικό Υπουργείο Παιδείας, του Πολιτισμού και της Επιστήμης σε μορφή μιας συμπληρωματικής κυβερνητικής επιχορήγησης. Οι ασφαλιστικές συνεισφορές καλύπτουν τις δαπάνες της φροντίδας ενώ η κυβερνητική επιχορήγηση προορίζεται να καλύψει το κόστος της υποδομής, του προσωπικού και του εξοπλισμού που απαιτούνται για να διατηρηθεί η λειτουργία του νοσοκομείου. Μερικές από τις ρυθμίσεις χρηματοδότησης μεταξύ του AZM και των ασφαλιστικών εταιρειών γίνονται σύμφωνα με ένα νέο χρηματοδοτικό σύστημα υγειονομικής περίθαλψης, το οποίο χρησιμοποιεί τους συνδυασμούς διάγνωσης-θεραπείας (σύντμηση στα ολλανδικά: DBC). Κάθε DBC καθορίζει το πακέτο των ιατρικών δραστηριοτήτων που απαιτούνται για την περίθαλψη του ασθενή. Για κάθε DBC, υπάρχει μια τοπικά συμφωνηθείσα τιμή που περιλαμβάνει τις δαπάνες νοσοκομείων και την αμοιβή του ιατρού. Η εισαγωγή του συστήματος DBC δεν είναι ακόμα πλήρης. Για τον προϋπολογισμό του 2003, οι ασφαλιστικές εταιρείες και το νοσοκομείο έχουν κάνει ήδη τις συμφωνίες σχετικά με 17 συγκεκριμένες διαδικασίες και επεμβάσεις, οι οποίες έχουν οδηγήσει σε περίπου 100 DBC (AZM, 2002).

Αυτή τη στιγμή, το AZM έχει 715 κρεβάτια συμπεριλαμβανομένων των κρεβατιών ημερήσιας φροντίδας. Υπάρχουν 22 λειτουργούντα χειρουργεία, επτά από τα οποία χρησιμοποιούνται για τη χειρουργική επέμβαση ημέρας. Σε μια ετήσια βάση, περίπου 22000 ασθενείς εισάγονται (με μέση παραμονή 9 ημερών) και περίπου 345000 ασθενείς εξυπηρετούνται στη μονάδα εξωτερικών ιατρείων. Ο ετήσιος προϋπολογισμός

του νοσοκομείου είναι περίπου 250 εκατομμύρια ευρό των οποίων 15% προέρχεται από το Υπουργείο Παιδείας, Πολιτισμού και Επιστήμης και το υπόλοιπο 85% χρηματοδοτείται από τους δημόσιους και ιδιωτικούς ασφαλιστές. Με πάνω από 4000 υπαλλήλους, το AZM είναι ο μεγαλύτερος εργοδότης στην περιοχή του Μάαστριχτ και ένα από τα μεγαλύτερα νοσοκομεία στις Κάτω Χώρες (Carpay, 1998).

Το AZM λειτουργεί στο περιβάλλον της αυξανόμενης οικονομικής πίεσης και του αυξανόμενου ανταγωνισμού. Πρόσφατα, το Υπουργείο Παιδείας, Πολιτισμού και Επιστήμης των Κάτω Χωρών, έχει υιοθετήσει μια πολιτική της μείωσης της κρατικής δαπάνης για τα δημόσια νοσοκομεία. Επομένως, οι τρέχουσες διοικητικές προτεραιότητες του AZM περιλαμβάνουν τον καθορισμό των στρατηγικών για να επιτύχουν την αποδοτικότερη και αποτελεσματικότερη απόδοση των νοσοκομείων. Παράλληλα με το ζήτημα μείωσης δαπανών, η διοίκηση του AZM έρχεται αντιμέτωπη και με την συνεχώς μεταβαλλόμενη αγορά. Αυτό συμβαίνει επειδή, η ολλανδική κυβέρνηση, καθώς επίσης και άλλες κυβερνήσεις της Ε.Ε., εγκρίνουν και ενθαρρύνουν τον ανταγωνισμό στον τομέα της υγειονομικής περίθαλψης. Ως αποτέλεσμα, τα περισσότερα ολλανδικά νοσοκομεία που τοποθετούνται κοντά στο AZM και τα κοντινά νοσοκομεία στο γειτονικό Βέλγιο και τη Γερμανία, έχουν υιοθετήσει τις μεθόδους μάρκετινγκ προκειμένου να αποκτηθεί το μεγαλύτερο μέρος της αγοράς μέσα στην οποία ανταγωνίζονται. Επίσης, ο αριθμός ιδιωτικών ιατρικών κέντρων που παρέχουν υπηρεσίες παρόμοιες με αυτές που παρέχονται από το AZM συνεχώς αυξάνεται. Αυτά τα ιατρικά κέντρα είναι συνήθως ιδιωτικές κερδοσκοπικές οργανώσεις που λειτουργούν με ένα επίπεδο υψηλής αποδοτικότητας δεδομένου της προσπάθειάς τους για οικονομική επιβίωση. Κατά συνέπεια, η χρηματοοικονομική απόδοση του AZM απειλείται.

Λαμβάνοντας υπόψη αυτές τις περιστάσεις, η ανάλυση χαρτοφυλακίου μπορεί να χρησιμοποιηθεί από τη διοίκηση νοσοκομείων για να προσδιορίσει τις δυνάμεις και τις αδυναμίες των δραστηριοτήτων τους και για να αναπτύξει τις στρατηγικές για μια ανταγωνιστική θέση προόδου.

4. Η εφαρμογή του μοντέλου χαρτοφυλακίου

Η εφαρμογή του μοντέλου multifactor matrix για το ΑΖΜ περιέλαβε τα ακόλουθα βήματα:

1) Επιλογή των υπηρεσιών που αναλύονται.

2) Επιλογή των κατάλληλων δεικτών ελκυστικότητας αγοράς και δυνατοτήτων νοσοκομείου.

3) Προσδιορισμός των μεθόδων υπολογισμού για τις τιμές των κριτηρίων.

4) Προσδιορισμός των διαδικασιών για την αξιολόγηση των κριτηρίων και υπηρεσιών.

Οι υπηρεσίες που συμμετέχουν στη multifactor ανάλυση χαρτοφυλακίου μπορούν να είναι υπηρεσίες που παρέχονται από διαφορετικά τμήματα ενός νοσοκομείου ή μπορούν να είναι υπηρεσίες ενός ενιαίου τμήματος. Εναλλακτικά, μπορούν να είναι δραστηριότητες μέσα σε μια συγκεκριμένη υπηρεσία που ένα τμήμα παρέχει. Η multifactor ανάλυση χαρτοφυλακίου μπορεί να ενδιαφερθεί και για τους δύο, υπηρεσίες που το νοσοκομείο παρέχει ήδη και υπηρεσίες, τις οποίες το νοσοκομείο αναμένει να παρέχει στο μέλλον. Αυτή η ευελιξία της multifactor ανάλυσης χαρτοφυλακίων προσφέρει μια ευκαιρία να καθοριστεί ένα περιεκτικό χαρτοφυλάκιο προϊόντων σύμφωνα με τις διοικητικές απαιτήσεις.

Η μελέτη που αναφέρεται εδώ ενδιαφέρεται για την αξιολόγηση των υπηρεσιών που παρέχονται αυτήν την περίοδο από ένα από τα νοσοκομειακά TCU's το ονομαζόμενο BZe IV. Ο σκοπός είναι να ερευνηθεί η ανταγωνιστικότητα αυτής της μονάδας στην παροχή της ιατρικής περίθαλψης. Για να επιλεχθούν οι υπηρεσίες, τρία κύρια ζητήματα λήφθηκαν υπόψη: η διαθεσιμότητα στοιχείων, η σχετικότητα και δέσμευση προσωπικού για το ερευνητικό θέμα. Καθορίζεται αρχικά για ποιες υπηρεσίες υπάρχουν εύκολα διαθέσιμα στοιχεία και ποια από αυτές μπορεί ενδεχομένως να απειληθεί από τις δραστηριότητες των ανταγωνιστών. Στη συνέχεια, ζητείται η συνεργασία του ιατρικού προσωπικού που παρέχει αυτές τις υπηρεσίες. Κατά συνέπεια, τρεις ορθοπεδικές υπηρεσίες BZe IV επιλέγονται ως προϊόντα χαρτοφυλακίων: η χειρουργική επέμβαση γονάτων, η χειρουργική επέμβαση γοφών και η αρθροσκόπηση.

Αφού επιλεχθούν οι υπηρεσίες, το επόμενο βήμα στη εφαρμογή του μοντέλου multifactor matrix είναι να επιλεχτεί ένα σύνολο κριτηρίων αξιολόγησης. Τα κριτήρια αποτελούνται από τους διάφορους δείκτες ελκυστικότητας αγοράς και δυνατοτήτων νοσοκομείου σχετικών με την παροχή υπηρεσιών. Όσον αφορά την ελκυστικότητα αγοράς, ο οργανισμός πρέπει να εξετάσει τους παράγοντες που θα έβρισκε επιθυμητούς (ή θα επιθυμούσε να αποφύγει) στην αγορά υπηρεσιών. Αυτοί οι παράγοντες μπορούν να διαιρεθούν σε πέντε σημαντικές κατηγορίες: χαρακτηριστικά αγοράς, ανταγωνιστική ένταση, οικονομικοί παράγοντες, τεχνολογία, και κοινωνικο-περιβαλλοντικοί παράγοντες. Ομοίως, αναφορικά με τις δυνατότητες νοσοκομείου, η οργάνωση πρέπει να εξετάσει τους παράγοντες που συνδέονται με την παροχή επιτυχών (ή ανεπιτυχών) υπηρεσιών. Αυτοί μπορούν να περιλάβουν τους παράγοντες που ανήκουν στις ακόλουθες κατηγορίες: ποιότητα προγράμματος, κεντρικότητα στην αποστολή, αποτελεσματικότητα αγοράς, διαφοροποίηση, οργανωτικές δεξιότητες και οικονομικοί παράγοντες. Ένας κατάλογος πιθανών κριτηρίων για την ελκυστικότητα αγοράς και τις δυνάμεις νοσοκομείου παρουσιάζεται στον πίνακα 2.

Για την ανάπτυξη ενός multifactor matrix, δεν χρειάζεται να επιλεχτούν όλα τα κριτήρια. Ο κύριος σκοπός είναι να απομονωθούν εκείνα τα κριτήρια, τα οποία μπορούν να προσδιορίσουν καλύτερα την ελκυστικότητας αγοράς και τις δυνάμεις νοσοκομείου. Ο κατάλογος των κριτηρίων αξιολόγησης μπορεί περαιτέρω να ρυθμιστεί σύμφωνα με τους στόχους της ανάλυσης χαρτοφυλακίου. Επειδή η καθιέρωση των αξιολογικών κριτηρίων απεικονίζει τη σημασία κάθε χαρακτηριστικού στην πραγματοποίηση των στόχων και της αποστολής του νοσοκομείου, οι διευθυντές και οι οικονομικοί ελεγκτές πρέπει άμεσα να συμμετέχουν στη διαδικασία επιλογής. Επιπλέον, πρέπει να εξεταστεί η διαθεσιμότητα των στοιχείων για κάθε κριτήριο. Οι δείκτες που απαιτούν ήδη τα διαθέσιμα στοιχεία προτιμώνται από εκείνους για τους οποίους η συλλογή δεδομένων είναι δύσκολη ή αδύνατη. Επομένως, ένα σχέδιο των στοιχείων που απαιτούνται για την αξιολόγηση κάθε κριτηρίου μπορεί να βοηθήσει τη διαδικασία επιλογής. Με βάση αυτές τις εκτιμήσεις και σε μια συζήτηση με τη νοσοκομειακή διοίκηση, καθορίζονται τα κριτήρια για την εφαρμογή του multifactor matrix στο AZM. Τα κριτήρια περιλαμβάνουν τέσσερις δείκτες της ελκυστικότητας αγοράς: ρυθμός ανάπτυξης, περιθώριο κέρδους, μέγεθος αγοράς και πολιτική αποζημιώσεων, και άλλους τέσσερις

δείκτες των δυνατοτήτων νοσοκομείου: χρησιμοποίηση της παραγωγικής ικανότητας, ποσοστό αποδοτικότητας, διαθεσιμότητα του επαγγελματικού προσωπικού και σχετική ποιότητα των προϊόντων.

Για να υπολογίσει τις τιμές των κριτηρίων για κάθε ορθοπεδική υπηρεσία που επιλέγεται για την ανάλυση χαρτοφυλακίων, εφαρμόζονται οι ακόλουθοι ορισμοί:

- *Ο Ρυθμός ανάπτυξης* γίνεται αποδεκτό ότι είναι η μέση ποσοστιαία αλλαγή στον όγκο των υπηρεσιών που παρέχονται κατά τη διάρκεια των προηγούμενων τριών ετών. Υπολογίζεται ως:

$$(1) \quad Growth\ rate = \frac{(AR2/AR1)+(AR3/AR2)}{2} \times 100\%$$

όπου *AR1*, *AR2* και *AR3* δηλώνουν το ύψος των εισαγωγών στο νοσοκομείο σχετικά με την κάθε ορθοπεδική υπηρεσία στο έτος 2001, 2002 και 2003 αντίστοιχα.

- *Το περιθώριο κέρδους* αντιπροσωπεύεται από το περιθώριο κέρδους μιας δεδομένης ορθοπεδικής υπηρεσίας, π.χ. από την αφαίρεση των μεταβλητών κοστών ανά μονάδα *VCu* από το εισόδημα ανά μονάδα *PU*. Η αξία των κριτηρίων υπολογίζεται ως:

$$(2) \quad Contribution\ margine = P_U - VC_U$$

Η αξία *του PU* υπολογίζεται ως συνολικό ποσό ανά μονάδα που πληρώνεται στο νοσοκομείο ενώ *Vcu* περιλαμβάνει τις δαπάνες υλικού και εργασίας ανά μονάδα που ποικίλλουν με την ποσότητα υπηρεσιών που παραδόθηκαν.

- *Το μέγεθος αγοράς* ορίζεται ως το ποσοστό μιας ιδιαίτερης ορθοπεδικής υπηρεσίας που παραδίδεται από το νοσοκομείο συγκρινόμενο με τη γενική ποσότητα αυτής της υπηρεσίας που παραδίδεται στην περιοχή. Για να υπολογιστεί η αξία αυτού του κριτηρίου, τα στοιχεία αποδοχής για το 2003 στην περιοχή του Μάαστριχτ χρησιμοποιούνται ως εξής:

$$(3) \quad Market\ size = \frac{Q_{hospital}}{Q_{region}} \times 100\%$$

όπου $Q_{hospital}$ είναι η ετήσια ποσότητα ιδιαίτερων ορθοπεδικών υπηρεσιών που παρέχονται από το νοσοκομείο και Q_{region} είναι η συνολική ετήσια ποσότητα αυτής της υπηρεσίας που παρέχεται στην περιοχή.

- *Η πολιτική αποζημιώσεων* αντιπροσωπεύεται από το ποσοστό της τιμής μιας δεδομένης υπηρεσίας νοσοκομείων που καλύπτεται από τους ασθενείς, τις

ασφαλιστικές εταιρείες ή την κυβέρνηση. Η αξία αυτού του κριτηρίου μπορεί να κυμανθεί από 0 ως 100%.

- *Η χρησιμοποίηση της παραγωγικής ικανότητας* είναι ο βαθμός στον οποίο ο εξοπλισμός, ο χώρος ή η εργασία χρησιμοποιούνται κατά την παροχή μιας υπηρεσίας. Ο τύπος που εφαρμόζεται για να μετρήσει τη χρησιμοποίηση της παραγωγικής ικανότητας είναι:

(4) $$Capacity\ utilization = \frac{T_{AV}}{T_{MAX}} \times 100\%$$

όπου T_{AV} αναφέρεται στις μέσες ώρες λειτουργίας μιας ορθοπεδικής υπηρεσίας που παραδίδεται ανά ημέρα και T_{MAX} είναι οι μέγιστες ώρες λειτουργίας της υπηρεσίας που το νοσοκομείο μπορεί εύλογα να στηρίξει με το να χρησιμοποιήσει τα ρεαλιστικά προγράμματα εργασίας και εξοπλισμού αυτήν την περίοδο.

- *Το ποσοστό αποδοτικότητας* καθορίζεται με μια σύγκριση μεταξύ των συντελεστών απαραίτητων να παραδώσουν μια υπηρεσία και μιας προκαθορισμένης ποσότητας συντελεστών. Για να μετρηθεί το επίπεδο αποδοτικότητας, η διαφορά αποδοτικότητας χρησιμοποιείται ως δείκτης. Ο ακόλουθος τύπος εφαρμόζεται:
- (5) $$Efficiency\ variance = (H_S - H_{AV}) \times UC_{OR}$$

όπου *το* H_S είναι η προκαθορισμένη διάρκεια μιας δεδομένης ορθοπεδικής λειτουργίας, H_{AV} είναι η μέση διάρκεια αυτής της λειτουργίας και UC_{OK} αναφέρεται στα κόστη μονάδας χρησιμοποίησης του δωματίου επέμβασης.

- *Η διαθεσιμότητα του επαγγελματικού προσωπικού* είναι ο αριθμός ιατρών, νοσοκόμων ή τεχνικών που παρέχουν μια δεδομένη υπηρεσία. Τα στοιχεία που απαιτούνται για να αξιολογήσουν την αξία αυτού του κριτηρίου είναι ο συνολικός αριθμός ειδικών διαθέσιμων στο νοσοκομείο σχετικά με την παροχή ορθοπεδικών υπηρεσιών σε κάθε κατηγορία προσωπικού.
- *Η σχετική ποιότητα των προϊόντων* είναι η γενική ποιότητα μιας υπηρεσίας που παρέχεται από το νοσοκομείο και η συμβολή της στη δυνατότητα του νοσοκομείου να ανταγωνιστεί στην αγορά. Για να μετρηθεί αυτό το κριτήριο, το ποσοστό των αποτελεσματικά θεραπευμένων ασθενών ανά υπηρεσία καθορίζεται ως εξής:

(6) $$Relative\ product\ quality = \frac{Q_{succesful}}{Q_{annual}} \times 100\%$$

όπου *το* Q_{annual} είναι ο συνολικός ετήσιος αριθμός ασθενών ανά ορθοπεδική υπηρεσία και *το* $Q_{succesful}$ είναι ο ετήσιος αριθμός ασθενών που θεραπεύτηκαν με επιτυχία.

Το τελικό βήμα στη εφαρμογή του μοντέλου χαρτοφυλακίου απαιτεί μια διαδικασία να σταθμίσει τα κριτήρια σύμφωνα με την ανάλογη σημασία τους. Δεν είναι όλα τα κριτήρια που περιλαμβάνουν την ελκυστικότητα αγοράς και τις δυνατότητες νοσοκομείου εξίσου σημαντικά για την τελική αξιολόγηση των προϊόντων χαρτοφυλακίου. Τα κριτήρια με την υψηλότερη σημασία πρέπει να ασκήσουν ισχυρότερη επίδραση στο τελικό αποτέλεσμα και το αντίστροφο.

Για να υπολογιστεί η ανάλογη σημασία, η ανάλυση χαρτοφυλακίου απαιτεί συνήθως μια συνέντευξη με έναν διευθυντή που αξιολογεί τη σημασία κάθε κριτηρίου λαμβάνοντας υπόψη τους στόχους του οργανισμού. Αυτή η εργασία, εντούτοις, εφαρμόζει μια πιο σύνθετη προσέγγιση στην αξιολόγηση σπουδαιότητας κριτηρίων. Αρχικά, λαμβάνουμε υπόψη την άποψη των ατόμων με το διαφορετικό επαγγελματικό υπόβαθρο (διοικητικό και ιατρικό προσωπικό) από τα διαφορετικά επίπεδα διοίκησης. Δεύτερον, θεωρούμε μια προσέγγιση ταξινόμησης αντί της συνηθισμένης διαδικασίας εκτίμησης για να προκαλέσουμε ενδιαφέρον στον ερωτώμενο. Τα άτομα που συμμετέχουν στην αξιολόγηση καλούνται να διανείμουν 100 βαθμούς μεταξύ των κριτηρίων αξιολόγησης σχετικών με την ελκυστικότητα αγοράς και άλλους 100 βαθμούς μεταξύ των κριτηρίων σχετικών με τις δυνατότητες νοσοκομείου σύμφωνα με τη σημασία που απέδωσαν σε αυτά τα κριτήρια (βλ. παράρτημα Α). Το σημαντικότερο κριτήριο σε κάθε σετ λαμβάνει το μεγαλύτερο βάρος και το λιγότερο σημαντικό λαμβάνει το χαμηλότερο βάρος.

Εκτός από την ανάλογη σημασία των κριτηρίων, είναι επίσης απαραίτητο να εκτιμηθεί κάθε υπηρεσία στην ανάλυση χαρτοφυλακίου σύμφωνα με τη σημασία τους στο νοσοκομείο. Παρόμοια με τις προηγούμενες αναλύσεις χαρτοφυλακίου που αναφέρθηκαν στη λογοτεχνία, χρησιμοποιήθηκε μια κλίμακα που κυμαίνεται από πολύ ανελκυστικό ως πολύ ελκυστικό. Εντούτοις, σε αντίθεση με άλλες μελέτες, η κλίμακα εκτίμησης κυμαίνεται από -3 μέχρι +3 (αντί των συνηθισμένων 0 έως 5) για να καταστήσει τη διαδικασία εκτίμησης ρεαλιστικότερη (βλ. παράρτημα Α).

4. Συλλογή δεδομένων

Για να συλλεχθούν τα στοιχεία για τις τιμές των κριτηρίων, προγραμματίστηκαν συναντήσεις με τους οικονομικούς ελεγκτές του AZM. Όπως στα περισσότερα δημόσια νοσοκομεία, η διαθεσιμότητα στοιχείων ήταν λιγοστή. Η βάση δεδομένων στο AZM σχεδιάζεται για να ικανοποιήσει πρώτιστα τις ανάγκες των εξωτερικών ιδρυμάτων (π.χ. έρευνας) και οι αναλυτικές πληροφορίες για τα στοιχεία δαπανών και άλλα χαρακτηριστικά της διαδικασίας παραγωγής είναι περιορισμένες.

Για να συλλεχθούν τα στοιχεία σχετικά με τη στάθμιση των κριτηρίων και την εκτίμηση των υπηρεσιών νοσοκομείου, αναπτύχθηκε ένα ερωτηματολόγιο. Τρία ζητήματα λήφθηκαν υπόψη κατά τη διάρκεια της προετοιμασίας του ερωτηματολογίου. Δεδομένου ότι οι ερωτώμενοι ήταν υπάλληλοι νοσοκομείου με διαφορετικό επαγγελματικό υπόβαθρο, τα κριτήρια που χρησιμοποιήθηκαν για να περιγράψουν την ελκυστικότητα αγοράς και τη δυνατότητες νοσοκομείου δεν τους ήταν εξίσου σημαντικά. Επομένως, ο καθορισμός της ορολογίας συζητήθηκε με το ιατρικό προσωπικό πριν από την έρευνα και περιλήφθηκε στο ερωτηματολόγιο για να βεβαιώσει τη συγκρισιμότητα των απαντήσεων. Εκτός από αυτό, η διατύπωση των ερωτήσεων συζητήθηκε με εμπειρογνώμονες και τους πιθανούς ερωτώμενους για να μειώσει τις προκατειλημμένες απαντήσεις. Λήφθηκε επίσης υπόψη, ο περιορισμένος χρόνος του προσωπικού του νοσοκομείου. Για αυτόν τον λόγο, το ερωτηματολόγιο έγινε όσο το δυνατόν πιο σύντομο και απαίτησε κατά μέσον όρο 10 λεπτά για να συμπληρωθεί.

Για τη διανομή του ερωτηματολογίου κατασκευάστηκε μια ιστοσελίδα, στην οποία οι ερωτώμενοι υπέβαλαν τις απαντήσεις τους. Μια βάση δεδομένων της Microsoft Access συνδέθηκε με την ιστοσελίδα για να συλλέξει αυτόματα και να παρουσιάσει τις υποβληθείσες απαντήσεις. Το link για το ερωτηματολόγιο στην ιστοσελίδα στάλθηκε στους εναγομένους μέσω e-mail. Το e-mail περιλάμβανε επίσης το στόχο του ερωτηματολογίου, μια σύντομη περιγραφή της ανάλυσης χαρτοφυλακίου και τις οδηγίες στους ερωτώμενους. Λαμβάνοντας υπόψη την ηλεκτρονική μέθοδο για τη διανομή του ερωτηματολογίου, ένα υψηλότερο ποσοστό απάντησης αναμενόταν απ' ότι σε περίπτωση έρευνας ταχυδρομείου.

Για να επιλεχθεί το δείγμα, χρησιμοποιήθηκαν οι διευθύνσεις ηλεκτρονικού ταχυδρομείου όλων των υπαλλήλων του AZM. Οι υπάλληλοι διαιρέθηκαν σε πέντε επαγγελματικές κατηγορίες: ορθοπεδικοί, παθολόγοι, νοσοκόμες, διευθυντές, και οικονομικοί ελεγκτές. Από κάθε επαγγελματική κατηγορία επιλέχτηκαν πέντε άτομα τυχαία. Συνολικά, στάλθηκαν 25 ερωτηματολόγια. Το ποσοστό απάντησης ήταν 56 %.

5. Αποτελέσματα

Τα στοιχεία σχετικά με τις τιμές των κριτηρίων παρουσιάζονται στον πίνακα 3. Τα αποτελέσματα στον πίνακα δείχνουν ότι σε σχέση με το ρυθμό ανάπτυξης και περιθωρίου κέρδους, η χειρουργική επέμβαση γονάτων εμφανίζεται να είναι ελκυστικότερη από τις άλλες δύο ορθοπεδικές υπηρεσίες, ενώ σε σχέση με το μέγεθος αγοράς, η χειρουργική επέμβαση γοφών είναι η αποδοτικότερη. Εάν ληφθούν υπόψη ο ρυθμός ανάπτυξης και η σχετική ποιότητα προϊόντος, η αρθροσκόπηση λειτουργεί καλύτερα από τη χειρουργική επέμβαση γονάτων και γοφών, αλλά είναι λιγότερο ελκυστική όταν αναλύονται η χρησιμοποίηση παραγωγικής ικανότητας και οι διαθεσιμότητα προσωπικού. Αναφορικά με την πολιτική αποζημιώσεων η αξιολόγηση των υπηρεσιών είναι ισοδύναμη, δεδομένου ότι όλοι τους καλύπτονται πλήρως από τις ασφαλιστικές εταιρείες.

Τα στοιχεία που συλλέγονται από το ερωτηματολόγιο που διανέμεται μεταξύ των υπαλλήλων του νοσοκομείου, συνοψίζονται στον πίνακα 4. Συνολικά, οι ερωτώμενοι συνδέουν την υψηλότερη αξία με το περιθώριο κέρδους και το ρυθμό ανάπτυξης ως δείκτες της ελκυστικότητας αγοράς και με τη σχετική ποιότητα των προϊόντων ως δείκτη των δυνατοτήτων νοσοκομείου. Όσον αφορά τη σημασία υπηρεσιών, η παροχή χειρουργικής επέμβασης γονάτων και ισχίων εμφανίζεται να είναι σημαντικότερη στους ερωτώμενους από την παροχή αρθροσκόπησης.

Για να υπολογιστούν τα συνολικά αποτελέσματα για κάθε υπηρεσία, τα στοιχεία στον πίνακα 3 και 4 συνδυάζονται με τον ακόλουθο τρόπο. Για κάθε υπηρεσία, η τιμή κάθε κριτηρίου είναι σταθμισμένη (πολλαπλάσια) από τη μέση ταξινόμηση του κριτηρίου και τη μέση εκτίμηση της υπηρεσίας. Παραδείγματος χάριν, για να σταθμίσει την αξία του ρυθμού ανάπτυξης για τη χειρουργική επέμβαση γονάτων, ο ρυθμός

ανάπτυξης της χειρουργικής επέμβασης γονάτων (90,7%) πολλαπλασιάζεται με τη μέση ταξινόμηση του ρυθμού ανάπτυξης (25.571) και τη μέση εκτίμηση της χειρουργικής επέμβασης γονάτων (2.615), η οποία οδηγεί στη σταθμισμένη αξία 60,70. Ομοίως υπολογίζονται και οι υπόλοιπες σταθμισμένες αξίες των κριτηρίων. Το ποσό των σταθμισμένων τιμών όλων των κριτηρίων σχετικά με την ελκυστικότητα αγοράς της παροχής μιας υπηρεσίας δίνει το συνολικό αποτέλεσμα εκείνης της υπηρεσίας όσον αφορά την ελκυστικότητα αγοράς. Ομοίως, το ποσό των σταθμισμένων τιμών όλων των κριτηρίων σχετικά με τις δυνατότητες νοσοκομείου της παροχής μιας υπηρεσίας δίνει το συνολικό αποτέλεσμα εκείνης της υπηρεσίας όσον αφορά τις δυνατότητες νοσοκομείου. Μετά από αυτήν την διαδικασία εκτίμησης, υπολογίζονται τα συνολικά αποτελέσματα για κάθε μια από τις τρεις ορθοπεδικές υπηρεσίες. Τα αποτελέσματα παρουσιάζονται στον πίνακα 5.

Ο πίνακας 5 προτείνει τα υψηλότερα συνολικά αποτελέσματα για τη χειρουργική επέμβαση γονάτων απ' ότι για τη χειρουργική επέμβαση γοφών και αρθροσκόπησης και όσον αφορά τα δύο, την ελκυστικότητα αγοράς και τις δυνάμεις νοσοκομείου. Εάν η χειρουργική επέμβαση γοφών και αρθροσκόπησης συγκριθούν, η πρώτη έχει ένα υψηλότερο συνολικό αποτέλεσμα σχετικά με την ελκυστικότητα αγοράς και η τελευταία να καταφέρνει ένα υψηλότερο συνολικό αποτέλεσμα σχετικά με τις δυνάμεις νοσοκομείου.

Τα συνολικά αποτελέσματα από τον πίνακα 5 χρησιμοποιούνται για να προετοιμάσουν το χαρτοφυλάκιο multifactor matrix. Το matrix παρουσιάζεται στην εικόνα 2. Ο οριζόντιος άξονας του matrix παρουσιάζει την ελκυστικότητα αγοράς και ο κάθετος άξονας παρουσιάζει τις δυνατότητες νοσοκομείου σχετικά με την παροχή μιας συγκεκριμένης υπηρεσίας. Κάθε άξονας έχει δύο σημεία περικοπής που καθορίζουν τα σχετικά επίπεδα δυνατοτήτων νοσοκομείου (αδύνατος, μέσος, ισχυρός) και ελκυστικότητας αγοράς (χαμηλός, μέσος, υψηλός). Το μέγεθος του κύκλου αντιπροσωπεύει το εισόδημα που παράγεται από κάθε υπηρεσία. Το μέγεθος εισοδήματος υπολογίζεται με τον πολλαπλασιασμό των ετήσιων αποδοχών το 2003 και της τιμής ανά παραδοθείσα μονάδα (βλ. πίνακα 3). Το γράφημα του multifactor matrix σχεδιάζεται με ένα σκοτεινό χρώμα στη χαμηλότερη δεξιά περιοχή, όπου η ελκυστικότητα αγοράς και οι δυνατότητες νοσοκομείου είναι χαμηλές. Η ευνοϊκή ζώνη

σχεδιάζεται με ένα ελαφρύ χρώμα. Κατά συνέπεια, οι διαφορές στο γράφημα μπορούν επίσης να χρησιμοποιηθούν για να γίνει σύγκριση μεταξύ των τριών υπηρεσιών.

Όπως φαίνεται στην εικόνα 2, η χειρουργική επέμβαση γονάτων βρίσκεται στο σχετικά ευνοϊκότερο κύτταρο του matrix που χαρακτηρίζεται με την ισχυρότερη δυνατότητα νοσοκομείου και την υψηλότερη ελκυστικότητα αγοράς. Επιπλέον, αυτή η υπηρεσία, όπως υποδεικνύεται από το μέγεθος του κύκλου της, είναι η δεύτερη μεγαλύτερη υπηρεσία με παράγοντα το εισόδημα σε σύγκριση με τη χειρουργική επέμβαση γοφών και αρθροσκόπησης. Και από τις τρεις υπηρεσίες, το υψηλότερο εισόδημα παράγεται από τη χειρουργική επέμβαση γοφών. Υπολογίζεται να είναι περίπου διπλάσιο από το εισόδημα της χειρουργικής επέμβασης γονάτων. Εντούτοις, έναντι της χειρουργικής επέμβασης γονάτων, η χειρουργική επέμβαση γοφών βρίσκεται σε μια πιο αδύνατη ζώνη που εκτιμάται με μέση ελκυστικότητα αγοράς και αδύνατες δυνατότητες νοσοκομείου. Η τρίτη ορθοπεδική υπηρεσία ,αρθροσκόπηση, λαμβάνει τις χαμηλότερες σχετικές ταξινομήσεις. Βρίσκεται στο πιο αδύνατο κύτταρο του multifactor matrix και παράγει το εισόδημα που είναι περίπου πέντε φορές χαμηλότερο από το εισόδημα που συνδέεται με τη χειρουργική επέμβαση γοφών και δύο φορές χαμηλότερο από αυτό της χειρουργικής επέμβασης γονάτων.

6. Ερμηνεία των αποτελεσμάτων

Τα αποτελέσματα χαρτοφυλακίου υπονοούν ότι η παροχή της αρθροσκόπησης είναι λιγότερο ελκυστική για το AZM από την παροχή χειρουργικής επέμβασης γονάτων και γοφών. Πρέπει να θεωρηθεί εντούτοις ότι η ανάλυση χαρτοφυλακίου που παρουσιάζεται εδώ, περιλαμβάνει μόνο τρεις τύπους υπηρεσιών από την ευρεία σειρά υπηρεσιών που παρέχεται από το AZM. Επομένως, τα συμπεράσματα πρέπει να ερμηνευθούν μόνο σε γενικές γραμμές. Σε περίπτωση που περισσότερες υπηρεσίες συμπεριλαμβάνονται στην ανάλυση, η δυνατότητα αυτών των συμπερασμάτων μπορεί να αλλάξει, δηλαδή η χειρουργική επέμβαση γονάτων και γοφών να εμφανιστεί λιγότερο ευνοϊκή από άλλες υπηρεσίες που παράχθηκαν από το AZM και η αρθροσκόπηση να προκύψει σαν ευεργετικότερη σε σύγκριση με άλλες δραστηριότητες του νοσοκομείου.

Η συγκριτική ταξινόμηση των τριών υπηρεσιών και η θέση τους στο multifactor matrix δείχνουν τις στρατηγικές για τη διαχείριση νοσοκομείου. Αυτές οι στρατηγικές μπορούν να καθοριστούν ως εξής.

Για τη χειρουργική επέμβαση γονάτων, που βρίσκεται στο ευνοϊκότερο κύτταρο του matrix, η διοικητική στρατηγική μπορεί να οριστεί ως cost leadership. Το νοσοκομείο πρέπει να στοχεύσει να αποκομίσει ένα πλεονέκτημα στην αγορά με την παροχή αυτής της υπηρεσίας με χαμηλότερο κόστος από τους ανταγωνιστές. Η μείωση δαπανών πρέπει να βασιστεί στην αρχή της οικονομίας κλίμακας. Παραδείγματος χάριν, ένα δωμάτιο για επεμβάσεις θα μπορούσε να χρησιμοποιηθεί μόνο για τις διαδικασίες γονάτων σε μέρες επέμβασης γονάτων. Αυτό μπορεί να μειώσει τις δαπάνες που είναι απαραίτητες για την προετοιμασία του δωματίου επέμβασης σε περίπτωση που ένας διαφορετικός τύπος λειτουργίας εκτελείται. Άλλη στρατηγική μείωσης δαπανών περιλαμβάνει την αποδοτική διοίκηση και την εφαρμογή της οικονομικώς αποδοτικής ιατρικής τεχνολογίας.

Η διοίκηση νοσοκομείου μπορεί επίσης να σχεδιάσει μια αύξηση στις επενδύσεις σχετικά με τη χειρουργική επέμβαση γονάτων προκειμένου να επιτευχθεί η επέκτασή της και να επιτύχει την κυριαρχία σε αυτήν την αγορά. Ειδικότερα, το AZM πρέπει να σχεδιάσει μια αύξηση στην χρηματοδότηση για έρευνα και στις κύριες δαπάνες για τη βελτίωση τεχνολογίας με σκοπό να κατακτήσει ένα επαρκές επίπεδο ιατρικής τεχνολογίας. Το νοσοκομείο θα μπορούσε επίσης να υιοθετήσει τα μη παραδοσιακά σχέδια επέκτασης συμπεριλαμβανομένου την προς τα πίσω ή προς τα μπρος κάθετη ολοκλήρωση. Εάν μια στρατηγική της οπίσθιας κάθετης επέκτασης γίνει αποδεκτή, οι δραστηριότητες του AZM μπορούν να αυξηθούν κατά μήκος της διανομής του εξοπλισμού γονατο-χειρουργικών επεμβάσεων προς τους προμηθευτές τέτοιου εξοπλισμού. Ένα παράδειγμα για μια οπίσθια κάθετη επέκταση περιλαμβάνει μια συγκέντρωση των σημαντικότερων προμηθειών για χειρουργικές επεμβάσεις γονάτων μέσα στη δομή του AZM. Εναλλακτικά, η εμπρόσθια κάθετη ολοκλήρωση προτείνει ότι το AZM πρέπει να κατευθυνθεί προς την παροχή φροντίδας του ασθενούς που είναι σχετική με τη χειρουργική επέμβαση γονάτων. Μπορεί να είναι επικερδές για το AZM να επενδύσει σε ένα κέντρο χειρουργικών επεμβάσεων γονάτων που υποστηρίζεται από πολυκλινικές και ένα κέντρο αποκατάστασης. Τέτοιες κάθετες ολοκληρώσεις μπορούν

να μειώσουν τις δαπάνες των προμηθειών και μπορούν να βελτιώσουν την ολοκλήρωση της διαδικασίας παραγωγής. Κατά συνέπεια, οι γενικές δαπάνες φροντίδας μπορούν να μειωθούν, οι οποίες μπορούν στη συνέχεια να ενισχύσουν την ανταγωνιστική θέση της των χειρουργικών επεμβάσεων γονάτων στο AZM.

Συγκρινόμενη με τη χειρουργική επέμβαση γονάτων, η χειρουργική επέμβαση γοφών βρίσκεται σε μια πιο αδύνατη ζώνη στο portfolio matrix που χαρακτηρίζεται από τις αδύνατες δυνατότητες νοσοκομείου και τη μεσαία ελκυστικότητα αγοράς. Παρά τη συγκριτικά δυσμενή θέση, πρέπει να ληφθεί υπόψη ότι αυτή η υπηρεσία επιφέρει μεγαλύτερα κέρδη και από την χειρουργική επέμβαση γονάτων και της αρθροσκόπησης. Επομένως, τα πιθανά οφέλη για το AZM της παροχής της χειρουργικής επέμβασης γοφών δεν μπορούν να αγνοηθούν. Λαμβάνοντας υπόψη την οικονομική επωφέλεια της χειρουργικής επέμβασης γοφών και της σχετικά πιο αδύνατης θέσης της, η διαχείριση του AZM πρέπει να σχεδιάσει την κατανομή πρόσθετων πόρων προκειμένου να αναπτυχθούν οι δυνατότητες νοσοκομείου σε σχέση με την παροχή της και να μετατοπίσει την υπηρεσία σε μια ευνοϊκότερη ζώνη. Η σημασία αυτής της στρατηγικής συσχετίζεται επίσης με το γεγονός ότι το δημογραφικό σχέδιο της περιοχής όπου το AZM λειτουργεί, αλλάζει. Οι ηλικιωμένοι αυξάνονται συνεχώς γεγονός που υπονοεί ότι μια αυξανόμενη απαίτηση για τη χειρουργική επέμβαση γοφών μπορεί να αναμένεται. Επομένως, η διοίκηση του AZM πρέπει να είναι σε θέση να προβλέψει τις αλλαγές σε εισαγωγές που απαιτείται και να ρυθμίσει επαρκώς την ικανότητα του νοσοκομείου σε σχέση με την παροχή χειρουργικής επέμβασης γοφών.

Μια άλλη διοικητική στρατηγική κατάλληλη για την παροχή χειρουργικής επέμβασης γοφών στο AZM, είναι η διαφοροποίηση. Η στρατηγική διαφοροποίησης περιλαμβάνει την τροποποίηση των χαρακτηριστικών της υπηρεσίας με την πρόθεση να κατασταθεί ουσιαστικά διαφορετική, ή τουλάχιστον να γίνει αντιληπτή ως διαφορετική από τους καταναλωτές, συγκρινόμενη με την ίδια υπηρεσία που παρέχεται από τους ανταγωνιστές. Αυτό προτείνει ότι σε σχέση με τη χειρουργική επέμβαση γοφών, η διαχείριση του AZM πρέπει να εστιάσει σε ζητήματα μάρκετινγκ. Η υπηρεσία μπορεί να διαφοροποιηθεί από εκείνες που παράχθηκαν από τους ανταγωνιστές με την υπογράμμιση του επιπέδου ποιότητας, της αποτελεσματικότητας της φροντίδας, της εύκολης πρόσβασης στις υπηρεσίες και της φήμης των ιατρών. Σαν ακαδημαϊκό

νοσοκομείο, το AZM έχει καθιερώσει βεβαίως μια ευνοϊκή φήμη και μια εικόνα μεταξύ του πληθυσμού στην περιοχή, ειδικότερα ως προς την εφαρμογή της πιο πρόσφατης ιατρικής τεχνολογίας. Επομένως, το νοσοκομείο μπορεί να χρησιμοποιήσει αυτά τα πλεονεκτήματα για να κερδίσει τις νέα τμήματα της αγοράς στην χειρουργική επέμβαση γοφών και για να πολλαπλασιάσει το πιθανό κέρδος που συνδέεται με την παροχή του.

Όπως προτείνεται από το multifactor matrix, η αρθροσκόπηση βρίσκεται στο πιο αδύνατο κύτταρο συγκρινόμενη με την χειρουργική επέμβαση γονάτων και γοφών. Επιπλέον, παράγει το χαμηλότερο εισόδημα. Λαμβάνοντας υπόψη αυτά τα αποτελέσματα, η διοίκηση του AZM πρέπει να εξετάσει προσεκτικά τις επενδύσεις που είναι σχετικές με αυτήν την υπηρεσία. Εάν γινόταν μια επιλογή, η κατανομή των πόρων στη χειρουργική επέμβαση γονάτων και γοφών θα ήταν ευεργετικότερη για το νοσοκομείο από τις επενδύσεις σε αρθροσκόπηση. Η στρατηγική που μπορεί να υιοθετηθεί σε σχέση με την αρθροσκόπηση είναι μια στρατηγική εστίασης. Μια στρατηγική εστίασης περιλαμβάνει τις μεθόδους προσδιορισμού μείωσης κόστους και τις θέσεις αγοράς όπου πρέπει να εστιαστούν στις προσπάθειες μάρκετινγκ. Παραδείγματος χάριν, εάν η αρθροσκόπηση γονάτου εμφανίζεται να είναι εφαρμογή αρθροσκόπησης με την υψηλότερη ελκυστικότητα αγοράς, τότε το νοσοκομείο πρέπει να εστιάσει στην ανάπτυξη μιας αποτελεσματικής και αποδοτικής διαδικασίας αρθροσκόπησης γονάτων και της προώθησής του. Για να βρεθούν τέτοιες θέσεις αγοράς εντούτοις, θα είναι απαραίτητα τα αποτελέσματα από την έρευνα αγοράς.

7. Συμπεράσματα

Το AZM ως μη κερδοσκοπικός οργανισμός που συσχετίζεται επίσης πολύ με την έρευνα και την εκπαίδευση, έχει διάφορα συγκεκριμένα χαρακτηριστικά. Το νοσοκομείο διαδραματίζει έναν σημαντικό ρόλο στην πειραματική/βασική κλινική έρευνα καθώς επίσης και στην εκπαίδευση και την κατάρτιση των ιατρικών σπουδαστών. Κατά συνέπεια, το AZM στρέφεται πρώτιστα στους μη κερδοσκοπικούς διοικητικούς στόχους. Εντούτοις, η αγορά και ο ανταγωνισμός διαδραματίζουν τον όλο και περισσότερο σημαντικό ρόλο στο περιβάλλον όπου το AZM λειτουργεί. Λόγω αυτών των συγκεκριμένων χαρακτηριστικών γνωρισμάτων, η εφαρμογή της ανάλυσης

χαρτοφυλακίων στο ΑΖΜ, που αναφέρεται σε αυτή την εργασία, εμφανίζεται να είναι σημαντική για τη διοίκηση του νοσοκομείου, αλλά είναι βασισμένη στην τροποποίηση του υπάρχοντος μοντέλου χαρτοφυλακίου.

Κατά τη διάρκεια της εφαρμογής της ανάλυσης χαρτοφυλακίου, αντιμετωπίζονται τέσσερις σημαντικοί περιορισμοί για την εφαρμογή του μοντέλου χαρτοφυλακίου στο ΑΖΜ. Κατ' αρχάς, η βιβλιογραφία που αναφέρει εφαρμογές των μοντέλων χαρτοφυλακίου σε οργανισμούς ιατρικής περίθαλψης είναι περιορισμένη και αυτό κυρίως περιγράφει τα αποτελέσματα από την υγειονομική περίθαλψη στις ΗΠΑ. Οι εφαρμογές της ανάλυσης χαρτοφυλακίου σε ευρωπαϊκούς νοσοκομειακούς οργανισμούς λείπουν. Αυτός ο περιορισμός εμποδίζει τη συγκριτική ανάλυση των αποτελεσμάτων.

Εκτός αυτού, λόγω των ελλειπών πληροφοριών για τις δαπάνες στο ΑΖΜ δεν συμπεριλαμβάνονται όλες οι ορθοπεδικές υπηρεσίες στην ανάλυση χαρτοφυλακίου. Αυτό υπονοεί ότι οι σημαντικές υπηρεσίες για τον προσδιορισμό θέσης του ΑΖΜ στην αγορά, δεν εμπλέκονται στην ανάλυση χαρτοφυλακίου. Επομένως, τα αποτελέσματα μπορούν να ερμηνευθούν μόνο σε γενικές γραμμές και να αποκλείεται η ανάπτυξη μίας γενικής στρατηγικής για την ορθοπεδική υπηρεσία.

Ακόμα κι αν η διαθεσιμότητα των στοιχείων ληφθεί υπόψη, η συλλογή των στοιχείων σχετικά με τις τιμές των κριτηρίων εμφανίζεται ακόμα ως ένας σύνθετος στόχος. Οι πληροφορίες δαπανών στο ΑΖΜ δεν είναι εύκολα προσιτές για έναν ερευνητή και η διαδικασία της απόκτησής της είναι μάλλον χρονοβόρα. Επιπλέον, το ΑΖΜ δεν διατηρεί τις εκτενείς πληροφορίες για το εξωτερικό περιβάλλον (π.χ. η ποσότητα υπηρεσιών που παρέχονται στην περιοχή). Κατά συνέπεια, για να διευθύνει την ανάλυση χαρτοφυλακίου, απαιτείται η συλλογή των πρόσθετων στοιχείων έξω από το νοσοκομείο, η οποία καθυστερεί περαιτέρω την ανάλυση.

Ένας ακόμα περιορισμός για την εφαρμογή του μοντέλου χαρτοφυλακίου στο ΑΖΜ αφορά την κατασκευή και τη διανομή του ερωτηματολογίου σχετικά με τις διαδικασίες στάθμισης κριτηρίων και εκτίμησης υπηρεσιών. Το ερωτηματολόγιο πρέπει να είναι όσο το δυνατόν πιο κατανοητό εάν διανέμεται μεταξύ των ατόμων με διαφορετικό επαγγελματικό υπόβαθρο (π.χ. διευθυντές, νοσοκόμες). Εντούτοις, λαμβάνοντας υπόψη το πολυάσχολο πρόγραμμα των ερωτώμενων, πρέπει επίσης να είναι

αρκετά συνοπτικό. Η προσπάθεια να κατασταθεί το ερωτηματολόγιο σύντομο μπορεί να μειώσει τη σαφήνειά του.

Οι προσπάθειες να υπερνικηθούν αυτοί οι περιορισμοί μπορούν να βελτιώσουν την εφαρμογή της ανάλυσης χαρτοφυλακίου και μπορούν να αυξήσουν την ισχύ των συμπερασμάτων της.

Η εφαρμογή της ανάλυσης χαρτοφυλακίου που παρουσιάζεται σε αυτή την εργασία προτείνει μια ανάγκη για την περαιτέρω έρευνα σε τρεις σημαντικές περιοχές:

- Η ανάλυση χαρτοφυλακίων πρέπει να τροποποιηθεί σύμφωνα με τις ιδιομορφίες καθ'ενός οργανισμού. Λαμβάνοντας υπόψη την περιορισμένη εφαρμογή της ανάλυσης χαρτοφυλακίου στις μη κερδοσκοπικές οργανώσεις όπως το AZM, περαιτέρω έρευνα είναι απαραίτητη για να καθιερωθούν τα κατάλληλα κριτήρια για ένα ακαδημαϊκό νοσοκομείο που λειτουργεί σε ένα ανταγωνιστικό περιβάλλον.
- Η μελλοντική έρευνα είναι επίσης απαραίτητη για να καθοριστεί η κατασκευή ενός παγκόσμιου portfolio matrix που να παρουσιάζει την ταξινόμηση των υπηρεσιών σε σχετικούς καθώς επίσης και σε απόλυτους όρους. Τέτοια έρευνα πρέπει ειδικότερα να εστιάσει στο πώς να καθοριστούν τα σημεία διάκρισης των κελιών του portfolio matrix κατά τρόπο αντικειμενικό ανεξάρτητα από την επιλογή υπηρεσιών.
- Η ισχύς και η αξιοπιστία της ανάλυσης χαρτοφυλακίου πρέπει να εξεταστούν προκειμένου να προσδιοριστεί η σχέση μεταξύ του σχεδίου χαρτοφυλακίου και της εγκυρότητας των αποτελεσμάτων χαρτοφυλακίου. Η έρευνα που στρέφεται σε αυτό το ζήτημα, μπορεί να βοηθήσει να καθιερωθεί η αξιοπιστία της ανάλυσης χαρτοφυλακίου για τους διευθυντές νοσοκομείου και το ιατρικό προσωπικό.

Σαν τελική σημείωση πρέπει να αναφερθεί ότι η ανάλυση χαρτοφυλακίου προορίζεται για να βοηθήσει, όχι να αντικαταστήσει, εκτελεστικές κρίσεις. Η ανάλυση χαρτοφυλακίου παρέχει απλά τους μηχανισμούς που μπορούν να βοηθήσουν τους διοικητές να αναπτύξουν τις συστηματικές διαδικασίες για τις υπηρεσίες που οι οργανισμοί τους παρέχουν. Δεν αποτελεί τον οικονομικό κίνδυνο σχετικό με τις ενέργειες διευθυντών και δεν θεωρεί όλους τους εσωτερικούς και εξωτερικούς περιβαλλοντικούς παράγοντες ουσιαστικούς στην ανάπτυξη μιας μελλοντικής στρατηγικής. Ειδικότερα, η ανάλυση χαρτοφυλακίου δεν καθορίζει εάν οι στρατηγικοί στόχοι είναι σύμφωνοι με τους οικονομικούς στόχους. Οι ελάχιστες αλλαγές στα

κριτήρια αξιολόγησης μπορούν να οδηγήσουν στη διαφορετική ταξινόμηση υπηρεσιών και στα αναλυτικά συμπεράσματα.

Εάν οι διευθυντές νοσοκομείων εξοικειωθούν με την έννοια της ανάλυσης χαρτοφυλακίου, μπορούν να μάθουν να ρυθμίζουν και να προσαρμόζουν τα μοντέλα προγραμματισμού χαρτοφυλακίου για να εξυπηρετήσουν τους συγκεκριμένους στόχους και τις ανάγκες των ιδρυμάτων τους. Παραδείγματος χάριν, οι μη κερδοσκοπικοί οργανισμοί θα παραμείνουν πρώτιστα στα κοινωνικά ζητήματα σχετικά με την παροχή υγειονομικής περίθαλψης. Κατά συνέπεια, αν και τα αποτελέσματα χαρτοφυλακίου, μπορούν να υπονοούν την ανάγκη για ένα νοσοκομείο να τερματίσει την παροχή δεδομένων υπηρεσιών, η διαχείριση του νοσοκομείου μπορεί να επιλέξει να συνεχίσει να παρέχει την υπηρεσία επειδή είναι απαραίτητο για την κοινωνία και επειδή μπορεί να σώσει ή να βελτιώσει τη ζωή των ασθενών.

Όταν μια δημόσια οργάνωση υγειονομικής περίθαλψης λαμβάνεται υπόψη, τα αποτελέσματα της ανάλυσης χαρτοφυλακίου μεμονωμένα δεν μπορούν να θεωρηθούν ως κριτήρια λήψης αποφάσεων. Πρέπει μάλλον να χρησιμεύσουν ως μια ένδειξη για τη μελλοντική στρατηγική, αλλά εξαρτάται από τη διοίκηση τελικά να αποφασίσει σχετικά με την εφαρμογή τους. Άλλα κοινωνικά κριτήρια όπως η δικαιοσύνη, οι κοινωνικές ανάγκες, και η κοινωνική ευημερία, ενδέχεται να ανταλλάσσουν τα συμπεράσματα, βασισμένα στην ανάλυση χαρτοφυλακίου.

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Παράρτημα Α. The English wording of the questions/ Το ερωτηματολόγιο στην Αγγλική γλώσσα

Q1. The following is a list of four characteristics of a hospital service that indicate the potential market attractiveness of providing that service. According to you, what is the level of importance of these hospital characteristics for the overall performance of AZM?

Please, distribute 100 points among the four characteristics in order to reflect the relative importance that you assign to them.

Growth rate
(the annual percentage change in the volume of a service provided) _____

Profit
(the excess of revenues over costs with regards to a service unit) _____

Size of the market
(the average number of patients per year who need a given hospital service) _____

Reimbursement policy
(the extend of insurance coverage of a given hospital service) _____

Q2. Bellow, there are another five characteristics of a hospital service that can be used to analyze the hospital strengths in providing that service. According to you, what is the level of importance of these hospital characteristics for the overall performance of AZM?

Please, distribute 100 points among the four characteristics in order to reflect the relative importance that you assign to them.

Capacity utilization
(the degree to which equipment, space or labour is used when providing a service) _____

Efficiency
(the inputs necessary to deliver a service compared to a standard input quantity). _____

Availability of professional staff
(the availability of physicians, nurses or technicians trained to provide a service) _____

Relative product quality
(the overall quality of a services compared to other hospital services) _____

The following questions concern your evaluation of three orthopaedic services for the overall performance of AZM. Please remember that we are interested in your personal opinion.

Q3. According to you, what is the level of importance of knee surgery for AZM?

(-3) ☐	(-2) ☐	(-1) ☐	(0) ☐	(1) ☐	(2) ☐	(3) ☐
extremely low importance	very low importance	low importance	moderate importance	high importance	very high importance	extremely high importance

Q4. In your opinion, what is the level of importance of hip surgery for AZM?

(-3) ☐	(-2) ☐	(-1) ☐	(0) ☐	(1) ☐	(2) ☐	(3) ☐
extremely low importance	very low importance	low importance	moderate importance	high importance	very high importance	extremely high importance

Q5. In your opinion, what is the level of importance of arthroscopy for AZM?

(-3) ☐	(-2) ☐	(-1) ☐	(0) ☐	(1) ☐	(2) ☐	(3) ☐
extremely low importance	very low importance	low importance	moderate importance	high importance	very high importance	extremely high importance

Πίνακας 1. Basic portfolio models/ Βασικά μοντέλα χαρτοφυλακίου

Model name	*Description*
PLC matrix *(Proposed by Steven Hillestad and Eric Berkowitz in the 1980's)*	*Applies the product-life-cycle (PLC) concept (introduction-growth-maturity-decline) to develop a classification matrix. The products are position on the matrix regarding both, product stage within the organization and at the market place. The product position determines one of the following strategies: go-for-it, differentiate, necessitate, maintain, harvest or drop.*[1]
BCG matrix *(First applied by the Boston Consulting Group in the 1970's)*	*Named after the Boston Consulting Group (BCG). It involves rating products according to their market share and market growth rate. The products are then plotted on a two dimensional matrix. Based on its position on the matrix the products are classified into one of the following groups: cash cows, stars, dogs and question marks. The classification of the product determines the management strategy.*[2]
GE multifactor matrix *(First developed by General Electric in the 1970's)*	*Named after General Electric (GE) where it was first applied. The model is conceptually similar to BCG. matrix, but somewhat more complex. A two dimensional portfolio matrix is created to classify the products. The dimensions include market attractiveness and organizational strength in offering the products, represented by multiple factors. The product position on the matrix determines the management strategies.*[3]
WDG matrix	*Represents the products on asterisk-like equidistant axes in the form of a footprint with regards to four ratios: indicators for supply and demand to represent the competitive environment, and indicators of resource leakage and resource assistance to account for the social effect of a given activity. The form of the footprint determines the management strategy.*[4]

For further details:
[1] see Walker and Rosko, 1988.
[2] see Hamilton and Zuckerman, 1986; Walker and Rosko, 1988.
[3] see Zallocco et al., 1984.
[4] see Drain and Godkin, 1996.

Πίνακας 2. List of possible criteria/ Λίστα πιθανών δεικτών

Market Attractiveness	Hospital Strengths
Size of industry (the number of clients who need the service)	**Market share** (the ability of the capture a significant market share in the industry segment under consideration)
Vulnerability (the historical volatility of the prices of inputs used in production of service)	**Professional staff** (the availability and relative quality of professional staff e.g. nurses, technicians, necessary for operation of the service)
Capital intensity (the magnitude of new capital expenditures required to enter the industry)	**Physician staff** (the availability and relative quality of managerial staff necessary for operation of the service)
Availability of personnel (the number of specially trained personnel required to provide the service)	**Managerial staff** (the availability and relative quality of managerial staff necessary for operation of the service)
Prestige (how the service affects the image of the hospital with relevant constituents i.e. physicians, patients, governing board)	**Accessibility to the market** (the degree to which various market segments relevant to the service are geographically, socially and financially accessible to the hospital)
Congruence with corporate mission (the extent to which the service adds to or detracts from the accomplishment of department goals)	**Ability to acquire funding** (the availability of funding for the service from both internal and external sources)
Governmental regulations (the restrictiveness of and the cost of compliance with government regulations)	**Strength of competitors** (the relative generation of lawsuits) strength of competitors in the hospital's market area)
Price sensitivity (the likely impact of price changes to demand)	**Easy of entry** (barriers to market entry by the hospital, including potential legal, financial and political roadblocks)
Technical problems (the complexity of the equipment or procedures required to provide the service)	**Location of facilities** (the relative location of facilities available to the service)
Potential for lawsuits (the risk for the hospital in case of a service failure)	**Newness of facilities** (the relative age of facilities available to the service)
Reimbursement policy (the depth and the extent of insurance coverage for the service as well as implications of the payment policies of the third parties)	**Relative product quality** (the overall quality of current services delivered by the hospital's ability to compete for patients, physicians, professional and managerial staff and other organization's hospital resources)
Life span of technology (the maturity of the technological equipment)	**Capacity Utilization** (the degree to which equipment, space or labour is used when providing a service)
Economies of scale (the concept that the average unit cost of a service can be reduced by increasing the output |rate)	Efficiency (the inputs necessary to deliver a service compared to a standard input quantity)
Legal (statutes and regulations that would prohibit or limit the provision of the service, 0 or 1)	
Social (how controversial the project is to the organization's important interest groups, 0 or 1)	
Environmental policy (the conformity of the project with various environmental standards, as well as the impact on the neighborhood and/or service area, 0 or 1)	
Growth rate (the average of the percentage changes in the volume of services provided during the past three years)	
Profit (the excess of revenues over expenses)	

Πίνακας 3. Estimation of the values of the criteria/ Υπολογισμός τιμών των δεικτών

	Criteria and Indicators	*Knee surgery*	*Hip surgery*	*Arthroscopy*
Market attractiveness	*Service growth rate:*			
	Admission rate in 2001	*178*	*355*	*548*
	Admission rate in 2002	*151*	*337*	*552*
	Admission rate in 2003	*146*	*349*	*550*
	Average change in the admission rate	***90.7% (reduction)***	***99.2% (reduction)***	***100% (constancy)***
	Profit size:			
	Material costs per unit	*€ 6332*	*€ 5554*	*€ 281*
	Labour costs per unit	*€ 1077*	*€ 973*	*€ 442*
	Fee paid to the hospital	*€ 9090*	*€ 7570*	*€ 1000*
	Contribution margin	***€ 1681***	***€ 1043***	***€ 277***
	Market share:			
	Annual provision by AZM	*146*	*349*	*550*
	Annual provision in the region	*1084*	*1113*	*2172*
	Percent provided by AZM	***11.87%***	***23.87%***	***19.49%***
	Reimbursement policy:			
	Percent paid by patients:	*0%*	*0%*	*0%*
	Percent paid by third party:	***100%***	***100%***	***100%***
Hospital strengths	*Capacity utilization:*			
	Average operation hours per day	*7.20*	*7.20*	*3.06*
	Maximum operations hours per day	*8.00*	*8.00*	*5.00*
	Utilization level	***90%***	***90%***	***61%***
	Efficiency rate:			
	Average operation hours per unit	*2.70*	*2.40*	*0.45*
	Standard operation hours per unit	*3.00*	*2.50*	*1.00*
	Unit cost of using an operating room	*€ 1058*	*€ 1058*	*€ 301*
	Efficiency variance	***€ 317***	***€ 106***	***€ 166***
	Availability of professional staff:			
	Number of physicians	*5*	*5*	*3*
	Number of other specialists	*-*	*-*	*-*
	Total number of specialists	***5***	***5***	***3***
	Relative product quality:			
	Annual delivered treatments	*146*	*349*	*550*
	Annual successful treatments	*144*	*338*	*547*
	Percent successful treatments:	***98.63%***	***96.85%***	***99.45%***

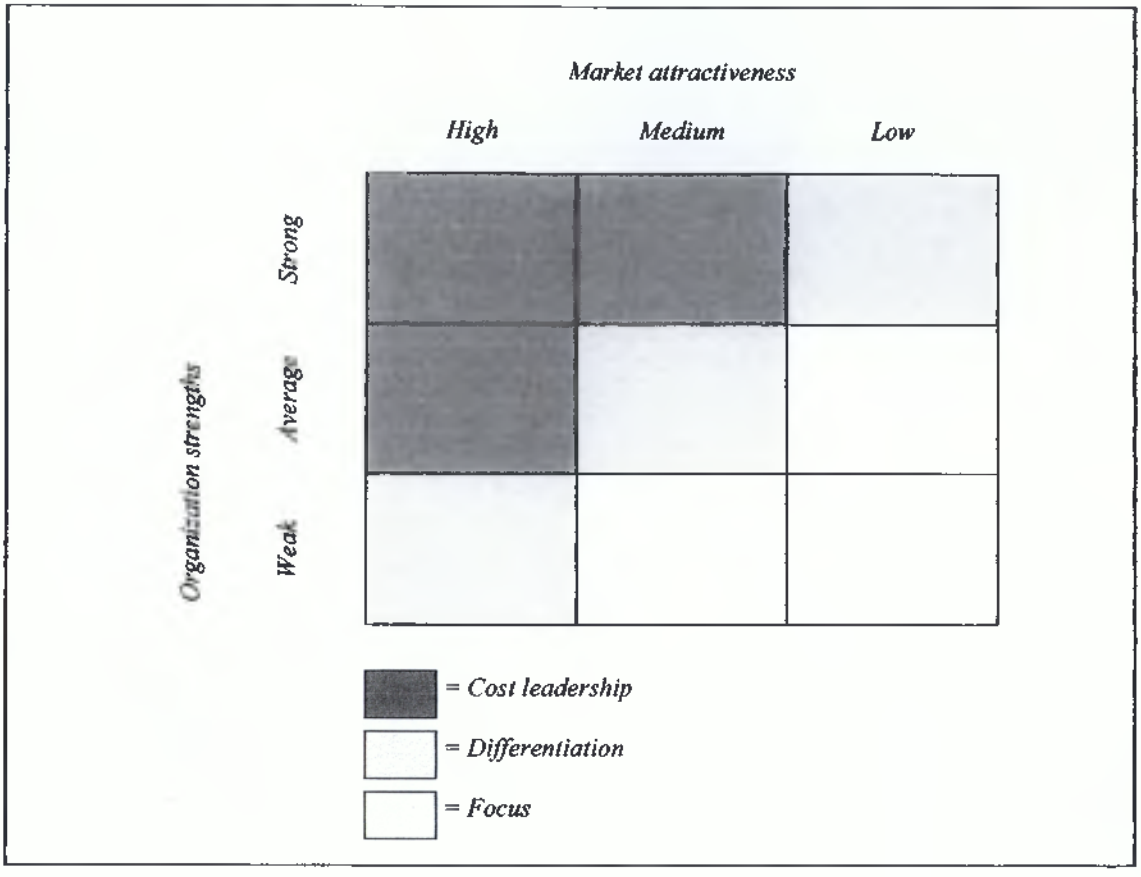
Πίνακας 4. Results of the weighting and rating procedures/ Αποτελέσματα από τις διαδικασίες αξιολόγησης και κατάταξης

	Criteria ranking								*Services rating*		
	Market attractiveness				*Hospital strengths*						
	Growth rate	*Profit size*	*Market share*	*Reimbursement policy*	*Capacity utilization*	*Efficiency rate*	*Availability of personnel*	*Relative product quality*	*Knee surgery*	*Hip surgery*	*Arthroscopy*
Median	*25*	*27*	*25*	*23*	*22*	*26*	*25*	*27*	*3*	*3*	*3*
Mean	*25.571*	*25.429*	*25.071*	*24.643*	*26.115*	*25.462*	*22.654*	*28.077*	*2.615*	*2.692*	*2.231*
Std.Dev.	*12.005*	*10.218*	*10.418*	*18.838*	*16.571*	*9.638*	*10.570*	*11.249*	*1.758*	*1.843*	*1.166*

Πίνακας 5: The total scores of market attractiveness and hospital strengths/ Τα συνολικά αποτελέσματα της ελκυστικότητας αγοράς και δυνάμεων νοσοκομείου

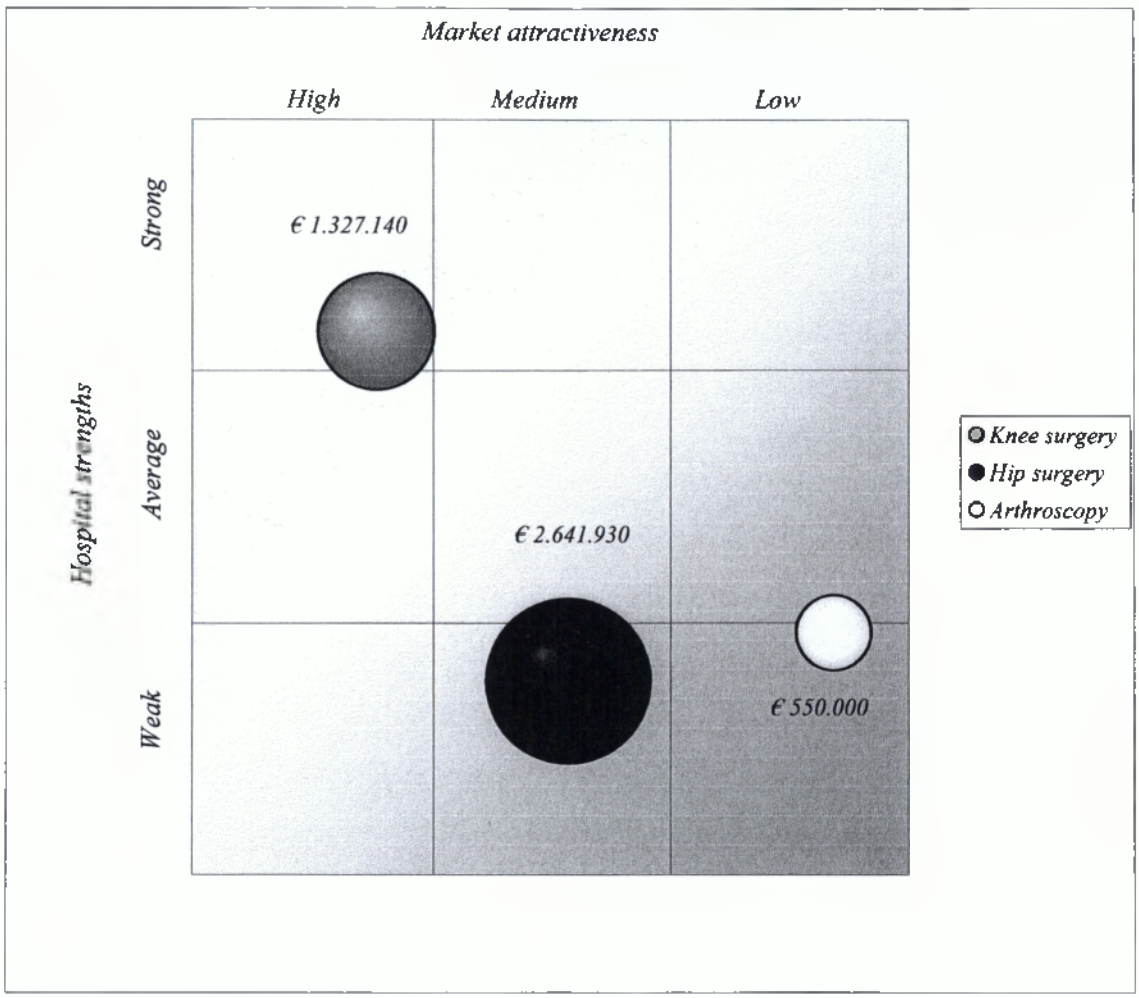
	Knee surgery	*Hip surgery*	*Arthroscopy*
Market attractiveness			
Growth rate	*60.65*	*68.29*	*57.05*
Profit size	*111781.18*	*71398.43*	*15714.79*
Market share	*7.78*	*16.11*	*10.90*
Reimbursement policy	*64.44*	*66.34*	*54.98*
Total score:	*111914.05*	*71549.16*	*15837.72*
Hospital strengths:			
Capacity utilization	*61.46*	*63.27*	*35.54*
Efficiency rate	*21106.85*	*7265.63*	*9429.75*
Availability of specialists	*296.20*	*304.92*	*151.62*
Relative product quality	*72.42*	*73.20*	*62.30*
Total score:	*21536.93*	*7707.03*	*9679.21*

Εικόνα 1. The multifactor matrix



Source: Zallocco et al., 1984

Εικόνα 2. Multifactor portfolio matrix for three orthopedic services in AZM/ Το Multifactor portfolio matrix για τις τρεις ορθοπεδικές υπηρεσίες στο AZM.



Technological Educational Institute of Kalamata
Department of Health and Welfare Units' Administration

Portfolio Analysis in Health Care Organizations:

An application to the strategic management process in the Academic Hospital of Maastricht, The Netherlands

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Summary

Portfolio analysis is becoming a really useful and necessary management tool for the hospital administrators in order to adopt the strategic management in health care organizations. The need for the portfolio analysis application in hospitals is generated by the continuously changing environment of the health care sector as well as the management orientation to effectiveness and efficiency. This study examines the portfolio analysis as a part of the overall strategic management process in the University Hospital Maastricht (AZM).

Chapter 1 describes the nature of strategic management as well as the process of its implementation. The chapter also focuses on the external and internal environmental analysis of the health care organizations.

Chapter 2 presents a definition of portfolio analysis, its characteristics and the process of application. The chapter analyses the applicability of portfolio analysis in the health care sector and present several portfolio models suitable for hospital management. Several models of portfolio analysis are outlined and discussed.

Next, chapter 3 presents a short overview of the University Hospital Maastricht and analyses the methodology used to the application of the portfolio analysis in the AZM. The steps followed to operationalise the portfolio model for the AZM, are subsequently presented.

In chapter 4 the results of the data analysis is presented and the multifactor matrix is illustrated. In this chapter, the values of the criteria are calculated and the results of the questionnaire that had been distributed among the employees of AZM are analyzed. Finally, the hospital services included in the study, are located on the multifactor matrix.

The last chapter of the thesis, chapter 5, outlines the implications of the portfolio analysis and discusses the future strategies that can be defined for the management of the AZM. The chapter concludes by outlining the limitations of the study and recommendations for further research.

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Introduction

The objectives of cost reduction, the changing demographic pattern and the increased reliance on a market mechanism have placed a great pressure on the public hospitals to develop more sophisticated planning systems. However, many hospitals continue to rely on traditional forms of planning focused on the internal factors of administration. These approaches have proven to be less flexible support systems for hospital management in a dynamic market. Furthermore, the health care sector, public and private, is facing enormous pressures to reduce costs, assume economic risk, improve quality and deal with fundamental reforms. Given these pressures, hospitals can easily loose the global perspective of the strategies necessary to achieve a long-term success. Therefore, the methods of strategic planning in hospitals are now increasingly applied to achieve more efficient and effective management.

Traditionally, the public health care organizations are considered to be governmental institutions. There is insufficient information about their costs and they do not have to compete for funding because all their expenses are covered by the government. As a result, these organizations are not concerned with profit but also efficiency is rarely considered. Given the present government objectives, however, to contain the health care expenditure, these organizations are facing external financial pressures. Simultaneously, their internal financial and administrative structure is unable to meet these challenges. The need for these organizations to adopt strategic planning approaches becomes highly relevant.

In view of that, the hospital administrators are more often concerned with the application of strategic approaches to be able to face the financial pressures. Therefore, the strategic management approaches applied in the business sector are becoming attractive for the hospital managers.

The study presented in this thesis, is related to the application of strategic management approaches in the public health care sector. In particular, the study examines the portfolio analysis and its application within the strategic management process of the Academic Hospital Maastricht in the Netherlands. The study outlines a procedure for the application of portfolio analysis as a strategic management process and its implementation in a public hospital setting.

The purpose of this study is to investigate how the portfolio analysis can be applied to the Academic Hospital Maastricht (AZM), how it can be used by the

hospital administrators in order to define future strategies for the hospital and what should be the focus of the future studies of portfolio analysis in the AZM. The purpose of the study is closely concerned with the fact that the AZM is a non-profit organization and possesses specific characteristics of an academic hospital.

In order to achieve the main aim of this study, the following objectives are defined:

a) Which portfolio models are already applied to hospital settings?
b) Which model is most suitable for the AZM regarding the priorities of the hospital management?
c) How can a portfolio model be operationalized considering the specific features of the AZM?
d) How can the hospital administrators define future strategies based on the results of the portfolio analysis and regarding to the overall goals of the hospital?
e) What difficulties can be experienced during the portfolio analysis and how the hospital management can overcome these difficulties?

The study applies a quantitative research approach. This approach requires the collection and analysis of quantitative data for the application of the portfolio analysis in the AZM. The collection of the data is based on questionnaires. The group of respondents consists of medical and management employees of the AZM. In addition to this, interviews with the financial personnel of the hospital are conducted. The analysis of the data collected is performed using Microsoft Excel spreadsheets.

Following this introduction, this thesis contains five chapters. The first chapter examines the nature of strategic management and its implementation process. The chapter focuses on the external and internal analyses of a health care organization. The second chapter presents an overview of portfolio analysis and the portfolio models. Chapter three outlines the study setting and describes the phases of the operationalization of the portfolio model. In chapter four, the results of portfolio approach are presented. Finally, chapter five is concerned with the interpretation of the results and the definition of future strategies for the AZM. It concludes by outlining the limitations of the study and recommendations for future research.

Chapter 1. Strategic management of health care organizations

1.1 Introduction

Nowadays, many changes are taking place in the health care institutions (aging of the population, market reforms, reduced public funding) that affect their internal and external environment. The greatest challenge for these institutions is to identify and plan these changes. For a successful response to this challenge, hospital administrators are adopting strategic management in their organizations. Strategic management provides a philosophy of health care management. Based on the organization strengths, it provides a framework for an efficient operation of the health care organizations. Strategic management allows the hospital administrators to consider various variables of the internal and external environment of their organizations. This aspect gives the managers the opportunity to respond to the changes that presently face their organizations. Therefore, strategic management is becoming a widely spread tool for health care management.

This chapter discusses the nature of strategic management as well as the process of its implementation. Next, the analyses of the external and internal environment, as part of strategic management, are presented.

1.2 The nature of strategic management

To understand the concept of strategic management, first it would be useful to define the terms strategy and strategic planning. These two terms are very closely related to strategic management. Strategy is "a pattern in a stream of decisions positioning an organization within its environment and resulting in the behavior of the organization" (Dunkan,1998). Strategy has been also described as a future-oriented plan that provides managers with decision-making guidelines. Strategic planning is "the set of process used in an organization to understand the strategic situation and develop decision-making guidelines (the strategy) for the organization" (Dunkan,1998). Considering these definitions, it is clear that the result of the strategic planning is a strategy and strategic management encompasses the process of strategic planning.

To describe the nature of strategic management, it is necessary to look at its benefits, advantages and disadvantages, as well as at its stages and levels of strategy. These characteristics of strategic management are described below.

1.2.1 What is strategic management?

Strategic management is based on the belief that organizations should continuously monitor the internal and external environmental trends so that future changes can be made in an effective and efficient fashion. Strategic management is defined as "an externally oriented philosophy of making an organization that links the strategic planning to oriental decision making" (Dunkan,1998). Strategic management "attempts to achieve a productive and creative fit between the organization's external environment and its internal situation" (Dunkan,1998).

Adopting strategic management will not guaranty the success or even the survival of an organization. As a philosophy of management, however, it provides a logical way to think about the organization, the environment and their changes. Furthermore, it takes years before a successful strategic management can become a part of the management policy of a hospital. Thus, it cannot be used as a short-term solution for the organization's weaknesses. The strategic management adoption in a health care organization should have a long-term orientation. The aim of strategic management is to identify issues that will be important in the future.

1.2.2 Benefits, advantages and weaknesses

The adoption and further development of strategic management provides many benefits to health care organizations. First, a successfully adoption of strategic management can improve the long-term financial performance of a hospital. Second, the practice of strategic management ties the organization together within a common purpose and goals. It offers to the organization the ability to develop a clear self-concept, specific goals and consistent decision-making. Strategic management requires the communication of all managers in a hospital at vertical and horizontal levels. The third benefit of adopting the strategic management is that the overall coordination of the organization can be rapidly improved. Finally, strategic management encourages progress and reduces the conservatism within a hospital in order to face the continuously changing environment.

The major abilities of the strategic management can be summarized as (Finlay,2000):

a) the ability to understand competitive behavior in a continuously changing system of competitors, customers and resources;

b) the ability to predict the results of a strategic move regarding the competitive environment;
c) the ability to predict risk and return with a sufficient accuracy to dedicate resources in new uses even though the benefits will be deferred;
d) the ability to act in time and effectively.

Strategic management has three major weaknesses that the hospital administrators should consider in order to manage their organizations strategically. The first weakness is that it takes long time for an organization to start managed strategically. Strategic management is a long-term philosophy that cannot be immediately efficient and completed after its adoption in a hospital. Six years is the period for most of the hospitals that have adopted strategic management before they registered improvements. This weakness determines strategic management as an efficient philosophy useful only for those organizations that are long-term oriented and do not face survival threatens. The second weakness of strategic management is that it requires the evolvement of the employees at all organization level to be successful. This means that the philosophy of strategic management has to become a part of the organizational culture. However, changes in the organization culture can be difficult and can raise barriers for hospital administrators to achieve a successful adoption of strategic management. The last weakness of strategic management is it that analyzes the present organizational situation and defines future strategies without considering that the environment of the organization might change before the future strategies is implemented. Therefore, in some cases, the strategies might not concern the real needs of the organization.

1.2.3 Levels of strategy

The strategic management process may be applied at different levels in the organization. The resulting strategies will differ in scope as well as in purpose as a manager move from one organizational level to another. The levels are: the corporate level, the divisional level and the functional level. Each level is providing the "input" for accomplishing the "outcome" of the next higher level (Dunkan,1998).

The corporate level is the broadest level of the strategic management. At the corporate level, the strategic management process defines the general markets or business in which the organization operates. It focuses on integrating semi-independent organizational units into an effective portfolio. A corporate-level strategy

must consider multiple markets as well as diverse products and technologies unique to each market. At the corporate level, strategic managers determine in which separate segment the corporation should select to compete. Therefore, at this level there is a wide range of strategic alternatives (diversification, vertical integration, and divesture).

Division-level strategic management is concerned with competition in a single market, with a single product line using technology appropriate for that market. Therefore, strategic managers are most concerned with a specified set of competitors within a well-defined market. Strategies at this level are usually limited to the organization's current area of operations (market development and product development).

A functional-level strategy may be developed within the functional departments of an organization. Functional strategies address two issues. First, they are intended to integrate the various sub-functional activities. Second, they are designed to relate the various functional area policies with changes in the functional area. Development of strategy at this level still involves situational analysis, strategy formulation, strategic implementation and strategic control. Strategies at the functional level support higher-level strategies.

1.3 Strategic management process

At that point, it is useful to mention the stages of the strategic management in order to analyze the levels of the strategy. Four stages of the strategic management can be identified: situational analysis, strategic formulation, strategic implementation and strategic control. To strategically manage an organization, a manager should understand the forces in the current situation; develop from that understanding a strategy that will move the organization towards the vision for the future; develop the functional level programs that will accomplish the strategy; and periodically evaluate the success of the strategy and make necessary changes.

Strategic management has been described as a management process with the objective to enforce the organization strengths in its external environment. To achieve this aim there are many internal and external factors that have to be considered. A type of framework must be developed and followed in order to implement a logical process. Strategic management is most easily understood and applied using a conceptual model of the process. The model represents a clear and practical approach

for understanding the external health care environment as well as the organization itself. In the process of strategic management, hospital administrators are involved in several strategic management processes, such as: organizational setting, situational analysis, strategy formulation, strategic implementation and strategic control. These strategic processes are described as the stages of a successful strategic management adoption (Dunkan,1998; Zuckerman,1998).

1.3.1 Organizational setting

The external environment of a health care organization strongly influences the organization and may be referred to as the organizational setting. The organizational setting involves the broader general environment and the more specific health care environment or the health care industry. These environments affect each other and also directly affect the organization.

The general environment is composed of all organizations outside the health care industry. Such organizations may be government institutions, business organizations, educational institutions and consumers. The organizations in the general environment generate technological, political and financial information that can be used by different economic sectors, including the health care industry. Therefore, a health care organization that engages strategic management should analyze the general information being generated in the external environment and detect the major shifts that are taking place.

The health care environment concerns information generated within the health care industry. Obviously, this information has a more direct benefit to a health care organization. Therefore, strategic managers should view the health care environment with the intention to understand the nature of changes taking place in health technology, social issues, regulations, political attitudes, economic realities and competition. The focus on these major change areas can facilitate the identification and the analysis of health care industry and its environmental issues that will affect a health care organization in future.

1.3.2 Situational analysis

The situational analysis of a health care organization is accomplished at three stages:

a) external environmental analysis,

b) internal environmental analysis;

c) the development of the organization's purpose, vision, mission and objectives.

These stages are not completely separated and can affect each other. The outcomes of these stages are the base for the development of a strategy.

External environmental analysis is an analysis that helps the organization to cross the boundary between itself and the external environment in order to identify changes that are taking place outside the organization. These changes can present both opportunities and threats to the organization and may arise from either the general environment or the health care environment. It is important that health care managers understand the nature of these opportunities and threats well before they affect the organization. Hospital administrators should respond to external opportunities and threats because they represent fundamental issues that can lead to success or failure of the organization.

The internal environment of a health care organization represents the potential of the organization. An understanding of the organization's potential requires an extensive analysis of the internal functions, operations, structure, resources and skills. An internal environmental analysis should show the strengths and the weaknesses of the organization. An understanding of these aspects provides strategies for maximum advantage of strengths and can help to overcome the weaknesses.

The purpose, vision, mission and objectives of an organization affect the strategy that an organization adopts. The purpose of the organization is the fundamental reason because of which the organization exists. Vision is the view of the future that management believes is the optimum for the organization when it is accomplishing its purpose. The vision is communicated throughout the organization. The organization's mission represents the organization's understanding of the external opportunities and threats, the internal strengths and weaknesses, and the organization purpose and vision. The objectives of a health care organization specify the major direction of the organization development and link the mission to organizational action.

1.3.3 Strategy formulation

Strategy formulation involves two strategic management activities and results in corporate and division level strategies for the organization. These activities are the process of developing the purpose, vision, mission and organizational objectives, as previously mentioned; and the process of developing alternatives, evaluating the alternatives, choosing a strategy and writing the strategic plan. The purpose, vision, mission and organizational objectives are included in the strategy formulation as well as in the situational analysis because they are decision-making activities that set the broadest direction of the organization's development.

Strategic alternatives represent the major "directions" of action available to the organization and are more specific than purpose, mission and objectives. The choice of strategic alternative creates impulse for an organization, which is reinforced as managers understand, commit and make decisions according to the organization's strategy.

1.3.4 Strategic implementation

When the strategy for an organization has been formulated and a strategic plan is written, functional strategies that support the organizational strategy are developed. Functional strategies must be developed for the marketing, finance, organizational and staffing functions. The strategy formulation process directly affects these functional areas. The functional strategies must be integrated in order to move the organization toward realizing its mission.

Strategies at the functional level are developed in a manner similar to the development of the organization's general strategies (corporate and divisional). Furthermore, a functional-level manager should understand the situation (functional environment, functional strengths, functional weaknesses, the purpose, vision, mission and objectives of the organization) and develop a functional mission, set functional objectives and develop a functional strategy that is supported by specific functional programs and budgets.

1.3.5 Strategic control

The last stage of the strategic management process is the strategic control. Strategic control is an inherent part of situational analysis and strategy formulation. It is often difficult to distinguish between these three management activities. Generally, control involves agreeing upon objectives, measuring performance, evaluating performance against the objectives and taking corrective action. More specifically, control is defined as a combination of components that act together to ensure that the actual performance comes as close as possible to the desired performance.

The need for strategic control generates strategic control systems that:

a) provide a means to coordinate the efforts of everyone in the organization;
b) motivate managers to achieve the objectives;
c) provide an early detection system that indicates when the strategic assumptions are inadequate or when the environmental conditions have changed;
d) provide a method for management to correct an ineffective or inefficient strategy.

The characteristics of the strategic control are described as following (Dunkan,1998):

a) all types of control require information; control will be only as good as the information on which it is based;
b) control should be directed at only few critical elements; for any process there are only three or four results that must occur in order to achieve an effective process;
c) control systems should be both flexible and cost-effective; an extensive application of control can lead to a situation, which may inhibit the real objectives of control;
d) control need to be simple and easy to understand; control that is very complex or difficult to apply is often ignored or applied incorrectly;
e) control systems should emphasize the exceptions; managers are often unable to constantly monitor all activities within their areas of responsibility.

1.4 Understanding and analyzing the external environment

The components of the external environment of a health care organization can be groups of organizations and individuals that create changes and generate important information within the environment of an organization. The members of the external environment may be broadly classified in a variety of ways depending on the strategic needs of the organization and the analysis of the environment. These groups of organizations and individuals are:

a) government institutions,
b) business organizations,
c) educational institutions,
d) religious institutions,
e) research organizations and foundations, and
f) individuals and consumers.

The external environment increasingly has become a factor in the success of the health care organizations. Because the success or failure of a hospital depends on factors outside the organization, the key to strategic management and furthermore to effectiveness and efficiency is to understand these factors (Zuckerman,1998). Health care organizations should focus to both effectiveness and efficiency, but given the choice, the health care organization should always first choose for effectiveness. Thus, strategic management should be directed towards positioning the organization most effectively within its changing environment. Therefore, the external analysis process attempts to identify, aggregate and interpret environmental issues. It provides information for the formulation of organizational purpose, vision, mission, objectives and provides the context for an internal analysis.

1.4.1 The goals of external environment analysis

As it is already mentioned, the purpose of the external environment analysis is to position the organization in its environment as well as to identify specific organization's goals. The specific goals of the environmental analysis can be formulated as (Dunkan,1998):

a) to classify and order information flows generated by outside organizations;
b) to identify and analyze current important issues that will affect the organization;

c) to detect and analyze the weak signals of emerging issues that will affect the organization;
d) to speculate on the likely future issues that will have significant impact on the organization;
e) to provide organized information for the development of the organization's purpose, vision, mission, objectives, internal analysis and strategy;
f) to promote the growth of the strategic thinking throughout the organization.

There are several sources of information in the external organizational environment. To assure that this information is meaningful to the organization, hospital managers should identify the sources and classify the information. Once the information is classified, important issues that will affect the organization may be identified and evaluated. In some instances, based on little information, hospital managers aim to identify patterns that suggest emerging issues and that can be significant for the organization. Such issues may represent significant challenges to the organization. Their early identification leads to an adequate development of strategy. This process often stimulates creative thinking concerning the organization's processes and development. It is valuable to the organization in the formulation of guiding vision and the development of mission and strategy.

1.4.2 The process of external environment analysis

There are several approaches to conduct an analysis of the external environment. Regardless of the approach applied, it appears that there are four fundamental stages common to all approaches. These four stages include:

a) scanning to identify signals of environmental change,
b) monitoring identified issues,
c) forecasting the future direction of the issues, and
d) assessing the organizational implications of the issues.

These four steps are required in any environmental analysis and should be assigned to individuals responsible for the environmental analysis process. Thus, a special staff, whose primary duty is to understand the issues in the external environment, may carry out environmental analysis (Dunkan,1998).

Each stage of the analysis of the external organizational environment has its specific functions and activities.

1) Scanning the external environment. The environmental scanning acts as a "window" to the organizations and generates information within the environment of a health care organization. Trough this window, managers engaged in environmental scanning, carry out three activities. In particular, they view external environmental information, organize external information into several desired categories and identify issues within each category. The scanning function is a process of moving the lens across the array of external organizations in search for current and emerging patterns of information. The scanning process aims to organize, accumulate and evaluate this information. The organized information is then used for the monitoring function.

2) Monitoring the external environment. The monitoring aims to track down trends, issues and possible events based on information from the scanning process. The monitoring process involves four activities:

a) identification of additional sources of information;
b) enlargement of the environmental database;
c) confirmation of issues;
d) identification of the rate of change within each issue.

Thus, the monitoring process investigates the sources and the information obtained in the scanning process. Its objective is to collect a database around essential issue. The database is then used to confirm the trends and developments as well as to determine the rate of change that takes place within the external environment.

3) Forecasting environmental analysis. This stage of the external analysis aims to extend trends, developments, dilemmas and events that the organization is monitoring. There are three activities involved at the forecasting function:

a) analysis of time changes of trends, developments, dilemmas or occurrences of an event;
b) identification of relationships between essential issues and environmental categories;
c) development of alternative projections.

4) Assessing environmental change. The process of assessment is rarely quantifiable and therefore, often judgmental. The complexity of the data that is collected is not always consistent with traditional decision-making methods. Different interpretations are a result of a variety of factors such as believes, perceptions, and past actions. The assessment process contains the following general steps:

a) evaluation of the significance of the forecasted issue for the organization;

b) identification of issues that must be considered in the formulation of the vision, mission, internal analysis and strategic plan.

A typical feature of the assessment process is the identification of issues by environmental category, the designation of an issue as an opportunity or threat, and the determination of its probable impact on the organization.

1.4.3 The limitations of external environment analysis

The external environment analysis does not provide guarantees for success. The process has some practical limitations that the organization should consider.

These limitations include (Johnson,1999):

a) environmental analysis cannot forecast the future;
b) managers cannot see all external trends and changes;
c) timely information is difficult or impossible to obtain;
d) delays to interpret the externals events can outweigh the benefits of the analysis of the external environment;
e) a general inability to respond quickly can offset the advantage of the issues detected;
f) managers held believes sometimes inhibit them from detecting important issues in the external environment.

Environmental analysis is never envisioned to predict the future but rather to read the signals that indicate what the requirements for the organization will be in the future. Even the most well organized environmental analysis can not predict all future changes. Discovering information is the key to environmental analysis. But even when the information is available, it may be difficult to interpret and recognize its real significance. The greatest limiting factor in external environment analysis is the preconceived believes of management. In many cases, what managers already believe about external issues inhibits their ability to accept signals for change. Because of managers believes, essential signals can be ignored when they do not conform to the managers' perceptions.

1.5 Internal environmental analysis

The effective management of an organization requires not only an understanding of the external forces, but also of the internal organizational strengths and weaknesses. It is through this process – understanding the opportunities and threats in the external

environment and relating them to the organization's internal strengths and weaknesses – that strategic managers are able to determine the distinctive competencies of the organization. Distinctive competence consists of the unique activities that the organization is able to do better than any other organization. Depending on the environment, distinctive feature may or may not actually result in a competitive advantage, because other health care providers may offer similar benefits. Nevertheless, much of the strategic management is a research of distinctive competence and ways to convert these competencies into unique advantages.

There are several factors that determine the internal strategic strength of a health care organization. Each of them is subsequently examined in order to outline the nature and the process of the internal organizational analysis.

1.5.1 Nature of organizational strengths and weaknesses

The question of identifying organizational strengths and weaknesses is a difficult but essential task for health care managers. The task is difficult because strengths and weaknesses can be both objective and subjective as well as both absolute and relative.

Some strengths possessed by a health care organization are well-defined given the objective standards. For example, the existence of one health care organization in a particular location may provide a strategic strength that cannot be duplicated by any other organization. An example of objective weakness is a situation when a health care organization has used more loans for financing its facilities than its competitors; and furthermore the manager of this organization may not be able to seek additional money for expansion.

In other instances the strategic strength or weakness may be subjective. An example of subjective strength is the perception of the hospital manager that the medical stuff is superior to the staff of other competitors. This organizational strength may not exist but the feeling of the hospital manager is a subjective strength. Weaknesses can also be subjective. The vision of the management board may be more conservative than that of other organizations. As a result, the management may be uncertain when it comes to taking risks.

Sometimes organizational strengths and weaknesses are absolute. An example of absolute strength is that some health care organizations are recognized worldwide as leaders (for example in medical education). To illustrate absolute weakness, it is useful to give an example of many community hospitals that are closed because of

inadequate reimbursement for service provision, lack of patients due to population shifts, and the inability to attract and maintain the adequate number of health professionals. These community hospitals shared common strategic weaknesses. That was their inability to survive in their competitive environments.

Finally, the strengths and weaknesses may be relative. An example of relative organizational strength is that one facility may have limited financial resources in comparison to national averages but considerably more funds than any of its competitors. The illustration of relative weakness can be present with the following example. A very famous academic health center may loose a famous surgeon to a local hospital that is attempting to enter an area such as heart transplants. The health center may be still very strong in terms of services provided but it has a relative weakness with regard to the facility because the surgeon is now relocated.

The problem to classify the organizational strengths and weaknesses is the fact that total agreement on the precise nature of each item is difficult to obtain. However, the adequate classification is of vital importance for the internal organizational analysis.

1.5.2 Process to assess the strengths and weaknesses

To determine the internal environment analysis of a health care organization the strategists should construct an initial list of some potential strengths and weaknesses. This list should be generated by surveying the six major functional subsystems of a hospital. These are:

a) clinical;
b) administrative services;
c) marketing;
d) financial;
e) general management;
f) physical facilities.

The purpose of this list is to give the hospital administrators a view of the strengths and weaknesses of the subsystems that comprise their organization, in order to define the overall internal situation of the organization.

There are various issues that could, and should, be discussed with regard to each of these subsystems in order to identify their strengths and weaknesses. Therefore, in each of these areas, the hospital administrators should provide an outline

of important questions that would normally be asked using the traditional audit approach. An "audit checklist" of potential strengths and weaknesses should include a review of four similar factors in each functional subsystem. These are:

a) Staff. Does the subsystem have an adequate staff in terms of both numbers and qualifications for the organization's present activities? Can the staffing base support the organization's future development? Does the organization have the managerial expertise needed to coordinate all the functional areas?

   Indicators regarding staff, include numbers of employees, estimates of adequate career paths, leadership depth and succession plans, and ratio of managers to non-managerial employees.

b) Information and intelligence. Is the internal information flow relative to clinical operations, administrative services, finance, marketing and general management sufficient to support day-today activities? Does the organization have a system for obtaining strategic information outside the organization?

   Indicators regarding these issues, include incidents of recurring needs to outsource programming services, overtime trends among key personnel needed to overcome information systems bottlenecks and delays in getting planned applications operational.

c) Technical capabilities. Does the organization have the equipment, facilities and knowledge necessary to accomplish the tasks required in each functional area?

   Indicators regarding technical capabilities, include complaints of space limitations, inability to decentralize computing because of limited local area networks.

d) Synergy. Are the objectives of the functional areas appropriate to accomplish organizational goals given the organization's competitive position, resources and opportunities?

   Indicators of synergy include communication of organizational strategies and goals to functional areas, ability of diverse information systems to interact with one other.

The audit checklist to define the strengths and weaknesses of an organization could be a table with two axes. The horizontal axis should present the six subsystems of the organization (clinical, administrative services, marketing, financial, general management and physical facilities). At the vertical axis should be given the four

criteria that indicate the strengths and weaknesses (staff, information and intelligence, technical capabilities and synergy).

1.5.3 Limitations of internal analysis

Although the traditional approach is useful in developing a list of possible organizational strengths and weaknesses and it is essential in providing indicators, some precautions are needed. First, checklists and audits are useful tools to guide the thinking process, but they are never exhaustive; important issues for individual organizations and specific circumstances are omitted even in the most comprehensive audit. Second, strengths and weaknesses cannot be assessed within the framework of a single function or subsystem. Third, some of the organization's most important strengths and weaknesses are not in its financial or marketing expertise but how it coordinates the various subsystems. Finally, the initial survey in the internal analysis, is based on general indicators. The goal of the survey is accomplished when a list is generated of potential strengths and weaknesses that can be investigated in greater detail and with more demanding measures.

1.6 Conclusion

In this chapter, the nature of strategic management is explored as well as the basic parameters regarding the effectively adoption of strategic management in a health care organization. It is important to note that strategic management decisions are largely judgmental, bur even though, crucial to the success of the organization. Furthermore, these decisions relate the entire organization to its environment and consider all of the organization's functions. They are also providing guidelines for management decisions at all levels as well as regarding the organization's missions, service area, goals, objectives, competitive advantage and outside relationships.

Strategic management is a philosophy. As a philosophy, it includes various tools that can be applied to develop an effective and efficient strategy to guide the decision-makers of a health care organization. Certainly, there are increasing criticisms towards strategic management for the fact that it approaches the environment with different degrees of uncertainty and can thus, alone cannot exercise a central control on the strategy developments.

Chapter 2. Portfolio analysis

2.1 Introduction

Presently, health care institutions are facing management problems related to changing financing patterns, increased competition, changing demographic patterns and more knowledgeable and demanding consumers of healthcare services. The changes in the public and private sectors have resulted in a more competitive market place where hospitals are at a greater risk regarding cost and volumes. For these reasons, hospital administrators are turning towards strategic management solutions that are already used in business firms. This is not surprising since the management efficiency problems faced by companies and hospitals today are similar. One of the business solutions that hospital managers have already adopted to categorize services they offer and determine the implications for resource allocation, is the portfolio analysis (Rosco,1988).

The following section presents a definition of portfolio analysis, its applicability to health care as well as the professionals involved in this analysis. The next section presents the general hallmarks of portfolio analysis and its process. Subsequently, the models of portfolio analysis are outlined and discussed. Finally the limitations of the analysis are presented and suggestions for the applications of the models are made.

2.2 The nature of portfolio analysis

Portfolio analysis has been a part of the private sector management for many years. It is a management tool that offers to the strategic planners a customized approach to classify their current or new products into categories based on their market attractiveness. Thus, the portfolio analysis suggests services/products with high market attractiveness to which the scarce organization's resources should be allocated. Each program is screened based on financial performance and organizational relevance. A decision-making matrix classifies the hospital programs into an orderly form. Portfolio analysis is designed to provide collective objectives and future directions for an organization. It also provides frameworks within which day-to-day operating decisions can be made intelligently. When the resources are scarce, portfolio analysis can be the key to keep a strategic plan on course (Rosco,1988; Bess,1990).

Hospitals have many reasons to adopt a portfolio approach such as: multiple programs and services; multiple publics (consumers, providers, funding organizations etc.); diverse market demand; important long-term capital investment decisions; changing industry technology; intensified intra- and inter-industry competition.

In response to the changing environment, many hospitals have attempted to become competitive stronger by using new health care services and also services not related to the health care sector. The health units have to examine their services systematically at the corporate level, in order to ensure their relevance to the corporate objects. The portfolio analysis improves strategic decision-making and control by assisting managers to evaluate the potentials lines of activity on an individual basis (Zallocco,1984).

Before starting the process of portfolio analysis however, the hospital administrators need to have a clear idea of the goal of their organization and to be focused in a long-term direction. If the limited resources threaten the survival of their organization, then it would be useless and inefficient to apply a portfolio analysis model. It would be preferable to focus on a short-term survival rather on pursuing its long-term vision. To reach a shared conclusion, regarding the resources that will be allocated and strategies that will be applied, the organizations key decision-makers should be involved in the portfolio process. It is necessary however, that the key decision-makers are prepared to assess individual programs as business units and the effect each program can have on the financial well-being of the hospital. They must be comfortable with the philosophical concept of the hospital as a firm and must accept the view of the clinical programs as business products (Bess,1990).

2.3 Overview of portfolio analysis

Portfolio analysis is based on five major assumptions, which the users of this management tool should consider before starting its application (Bess,1990):

a) An organization is a structure of units.
b) Units are managed in accordance with the political, economic, demographic, technological and social environment.
c) Units are subject to inspection and changes independently of other units that comprise the organization.

d) An organization can be taken in a predetermined direction by specific decisions about individual units rather than by taking the units forward based on organizational decisions.

e) An organization's position in an environment will probably not reflect that of the individual units comprising the organization.

These assumptions determine the specific characteristics of the portfolio approach. Portfolio analysis is described as (Zallocco,1984):

a) *Long term-orientation*. It is necessary to determine the planning horizon before starting the analysis. Three years may be long enough to allow for strategic developments. Yet, it may be short enough to ensure that the portfolio analysis is closely linked to the day-to-day marketing program.

b) *Integrated approach*. In developing a portfolio analysis, all aspects of the organization are treated simultaneously. This allows for an overall assessment of the effects of all organization's aspects and results in a comprehensive plan for the entire organization.

c) *Focus on effectiveness*. The primary objective in portfolio analysis is to determine the most effective programs. Perhaps, there can be details on how to improve efficiency, but this should not be the primary objective of the portfolio process.

d) *Comprehensive organizational review*. Portfolio analysis calls for a complete review of the organization, its environment, mission, objectives and strategies. Therefore, it avoids the tendency of adding new activities to already existing programs, without carefully considering all options.

e) *Extensive involvement*. All management positions should be involved in the development and the implementation of portfolio analysis.

f) *Intraorganizational communication*. Organizational communication must be adequate enough to allow for completion of the necessary planning tasks in portfolio analysis.

g) *Written document*. The result of portfolio analysis is a written document or management plan, which provides a guide for short-term decision-making.

The portfolio analysis consists of the following steps (Zallocco,1984; Rosco,1988):

a) Define products. The first step is to clearly identify the products or services for which the hospital administrators are developing a strategy. Sometimes it is a

matter of listing them. In other instances, it is necessary to group products together, based on their specificity.

b) Selection of criteria. The selection of the criteria to be used, is the most important step of the portfolio process. If the criteria are not adequate, the managers will end up with strategies that are ineffective and perhaps damaging.

c) Perform a situation analysis. The situation analysis of the environment where the hospital operates, includes an analysis of competitive trends, technological changes, basic consumption and economic changes as well as analysis and assessment of the relative position of the hospital. The situation analysis also includes assessment of strengths and weaknesses, attractiveness of existing programs, available funding.

d) Apply a portfolio model. There are several models of portfolio analysis that are used to evaluate services and products. The application of portfolio analysis in the health care sector is illustrated in the subsequent sections.

e) Develop specific tactics for the upcoming periods. This step involves decisions about allocation of resources to each program, new resources that need to be acquired, promotion strategies and pricing details. The objective here is to develop a working document with sufficient details to guide day-to-day hospital operations.

2.4 Portfolio analysis models

There are several models of portfolio analysis developed by universities and organizations that are searching for an ideal form to adopt portfolio analysis. The reason for the variety of different portfolio models is that each institution has an individual philosophy and needs depending on the environment where it operates. Although the organizations differ, the structure of some portfolio models has many similarities since the purpose of an adoption of a portfolio model is the same.

Among the variety of the portfolio models, four of them could be considered as the most general and commonly used in the health care sector. These portfolio models are: product life cycle matrix, Boston consulting group matrix, multifactor matrix and WDG matrix.

2.4.1 Product life cycle matrix

Hillestad and Berkovitz (1984) argue that adequate marketing strategies must be based on the stage of the product development at the marketplace and in the organization. Therefore, the authors proposed the application of the product life cycle (PLC) as bases of the portfolio matrix. The model uses the organization life cycle and the market life cycle as axes of the portfolio grid. This life cycle framework can help administrators, planners, community leaders, physicians and other health care professionals to anticipate and plan for the challenges of the health system integration (Berber,1998).

The PLC regarding the market and the organization consist of four stages that are: introduction, growth, maturity and decline (Rosco,1988). *Introduction* is the stage, when the product is first brought to the market. Sales and revenue are likely to be low because the market is not familiar with the new product/service. Profitability is low during this period because of high marketing and development costs. Products that survive the introduction stage proceed to the next stage characterized by a rapid *growth*. The absence of a large number of rivals might allow profit to improve during the stage of growth. However, the revenue generated by an increase in the sales rate often is used to support this growth. Next stage is the *maturity* of product. It is characterized by an intense competition for market share. During this period, profit decreases and sales growth begins to slow. The last stage is the *decline* period during which profits and sales continue to fall. The product may still be profitable because many competitors may have already exited the market and the need for marketing may have been reduced. (The PLC matrix is presented in Figure 2.1) Each stage involves administrators, planners, community leaders, physicians and other health care providers. According to the position of the service at the organization PLC and marketplace PLC, the service is located on the PLC matrix.

As shown on figure 2.1 the location of the product at the organization and marketplace life cycle generates six alternative management strategies: go for it, differentiate, necessity, maintenance, harvest and drop. Because the terms differentiate, harvest and drop are self-explanatory, the discussion is restricted to three strategies that need further explanation. *The go-for-it option* is best suited to organizations that introduce a product to a new market. It consists of obtaining a strong market recognition, which in health care setting is often related to quality. Accordingly, this option consists of strict quality control activities, as well as large

promotional expenditures. *The necessity strategy* is most appropriate when the marketplace PLC is matured but the organization's PLC is in an introductory or growth stage. This strategy consists of finding out an adequate niche for the product within a segment or market segment for the product. *The maintenance strategy* is most suitable when the organization and the marketplace PLC are both in the mature stage. If the product/service contributes to the organization's goals, it should be maintained but not expanded or dropped, because the costs incurred to expand the market share are likely to exceed the incremental benefits associated with the increasing growth.

FIGURE 2.1

Product life cycle matrix

Market place life cycle

Organization life cycle	Introduction	Growth	Maturity	Decline
Decline	X	X	X	Drop
Maturity	X	X	Maintenance	Harvest
Growth	X	Differentiate	Necessity	Harvest
Introduction	Go for it	Differentiate	Necessity	Drop

x = Position can not occur

Source: (Rosco, 1988)

Though the PLC model is useful for identifying some strategic alternatives, the application of this concept in many cases leads the organizations to costly mistakes. One of the most significant difficulties of using the PLC model is that a substantial amount of information is required to locate the product in its life cycle. Also the PLC approach is based on the assumption that the chief goal of the organization is profit, which is related to growth. In addition to that, most hospitals maintain a non-profit

status. Finally, the model does not explicitly recognize barriers to entry and exit that may be important factors in the health care industry (Rosco,1988).

2.4.2 Boston consulting group matrix

Portfolio analysis popularized by the Boston Consulting Group (BCG), has become a fundamental tool for strategic analysis. The market position of the health care organization as a whole or its separate programs, can be examined in terms of its share of the market and the rate of the market growth. The traditional BCG portfolio analysis matrix graphically portrays differences among the various services (stars, cash cows, problem children and dogs) in terms of relative market share and market growth rate. (The BCG matrix is presented in figure 2.2).

Relative market share is defined as the ratio of a strategic service unit (SSU) to the market share held by the largest rival organization. The relative market share is illustrated in the horizontal axis of the matrix. The midpoint of the horizontal axis is usually set at 0.50, which corresponds to a SSU whose market share is half that of the leading provider.

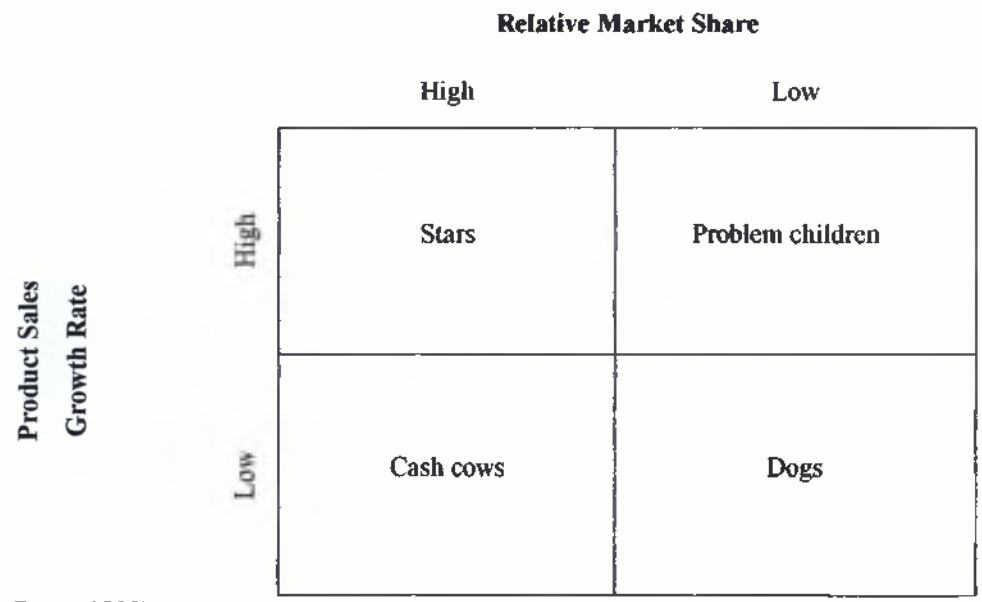
Growth rate is usually measured by the changes in level of gross service revenues, or by population and service utilization growth (e.g. admissions or inpatient days). Classification as high, medium or low may be determined through the comparison with national or regional health care growth figures, the prime rate, return on alternative investments or the stage in the product life cycle.

The *stars* are high-growth businesses that compete in established markets where they are relatively strong compared with the competitors. These services represent the organization's best long-run opportunity for growth and profitability. Often they require heavy investments to sustain their growth. Eventually, their growth will slow down and, assuming they maintain their relative market share, will become cash cows. The *cash cows* are low-growth businesses with a relatively high market share. These are matured, successful businesses with a relatively little need for investment. They need to be efficiently managed to continue to generate profit that the organization can use for investing in them. The *problem children* are businesses with low market share that operate in growing markets. This suggests that they have potential, but may require substantial investments in order to expand their market share at the expense of more powerful competitors. Management should be highly concern with the problem children. Which ones should they invest in? Which ones

should they allow to fail or shrink? The last group in the BCG model is the *dogs*. The term "dogs" refers to businesses that have relatively low shares in unattractive, low-growth markets. Dogs may generate enough cash to break-even, but they are rarely, if ever, worth investing in. These services should consume fewer and fewer of the organization's resources. Because of their weak position, the services in this quadrant are often liquidated or divested or the organization engages in dramatic retrenchment(Dunkan,1998).

FIGURE 2.2

Boston consulting group matrix



Source:(Rosco,1988)

The BCG matrix provides a framework for allocating resources among different organization units and allows the managers to compare many organization units at once. The model determines the programs and services where the hospital administrators should invest in, the ones they should drop and the ones they should "milk" by focusing on their efficient delivery. Service line in the upper left quadrant of the BCG matrix (see figure 2.2) has high market growth and a relatively high market share. This service is the most attractive for the institution. It should be provided with additional resources and encouraged to grow (and become cash cow). The service in the upper right-hand quadrant over time will move into the stars or dogs quadrant. It is important to nurture the service in order to assure that they most

likely move to the stars quadrant. The problem-children services have low growth rates as well as low relative market share and may be targets for contracting strategies. However, in health care some "dogs" quadrant services may be considered for stabilization or even expansion because of community needs. The cash-cow services have achieved high market share but the growth rate has slowed. This service should generate excess cash that may be used to develop stars and problem-children services.

There are seven important steps to be followed when applying the BCG model in a health care organization: These are (Huges,1997):

a) Specify the products or services for which managers are preparing strategy.
b) Define the classification criteria. Every organization needs to consider its vision, describing what the organization wants to become in the long-term, and to set the criteria accordingly.
c) Assess market attractiveness. Market attractiveness refers to how attractive the hospital administrators find the market they are competing in with their products and services. To apply BCG model it is necessary to select few attributes of market attractiveness and weight them by their importance. Finally the weighted attributes are allocated in a rating scale and the total score is calculated.
d) Assess relative competitive position. There are two steps to be taken: an assessment of which particular attributes would provide an organization with a strong competitive position, and an assessment of the relative strengths of these attributes concerning the competitors. The attributes chosen must be weighted, by their importance. Finally the attributes weighted are allocated in a rating scale and a total score is calculated.
e) Complete the portfolio grid. Each product is placed on the portfolio grid, based on its total score with respect to market attractiveness and relative competitive position.
f) Consider the current positions of products/services. Each product in the portfolio grid is classified according to its position as a "Star", "Milk Cow", "Problem Children" or "Dog" (see figure 2.2).
g) The classification of the products suggests management strategies, which can be grouped in four possible categories:
    - Build Share: The organization invests to increase the market share of a product/service (for example turning a problem children into a star).

- (b) Hold: The organization invests just enough to keep the program/service in its present position.
- (c) Harvest: The company reduces the amount of investment in order to maximize the short-term cash flows and profits from the program/service. This may have the effect of turning stars into cash cows.
- (d) Divest: The company divests itself of the product/service by selling it out in order to use the resources elsewhere (e.g. investing in a more promising problem children).

Though the BCG model has been successfully used, they're several problems that potentially limit its applicability in the health care sector. The first pitfall of the model concerns the reliance on market share as the most important influence on marketing strategy. There are many sociopolitical forces to consider before focusing at the market share. Second the use of only two dimensions in portfolio analysis is criticized. There are suggestions for a three-dimensional BCG portfolio model where profitability is added to the market share and the rate of growth to measure the performance of the organization (Rosco,1988; Bess,1990).

2.4.3 Multifactor matrix

The General Electric Company suggests a multifactor matrix that overcomes some of the limitations of the two-factor BCG portfolio matrix (Zallocco,1984). The multifactor matrix model consists of nine cells based on rankings of organization strengths and market attractiveness. (The multifactor matrix is presented in figure 2.3). The model provides a system for evaluating clinical departments, existing programs, new programs or other strategic business units on the dimensions of organization strengths and market attractiveness. Within these two general dimensions, several specific performance criteria are weighted by importance and each service is rated based on the criteria. Finally, services receiving are assigned to a nine-cell strategic grid based on the weighted ratings. The grid has three zones, each suggesting particular strategies for the services within the zone. Services in the most favorable zone may be designed for cost leadership, those in the moderate zone for differentiation, and those in the weakest zone for possible focus. The multifactor model is based on five assumptions, which are:

a) The attractiveness of a service is a function of the attractiveness the market where it serves and the strength of the hospital in serving that market;

b) The factors that contribute to market attractiveness and organizational strengths are identifiable and can be assessed, either quantitatively or through expert judgment;

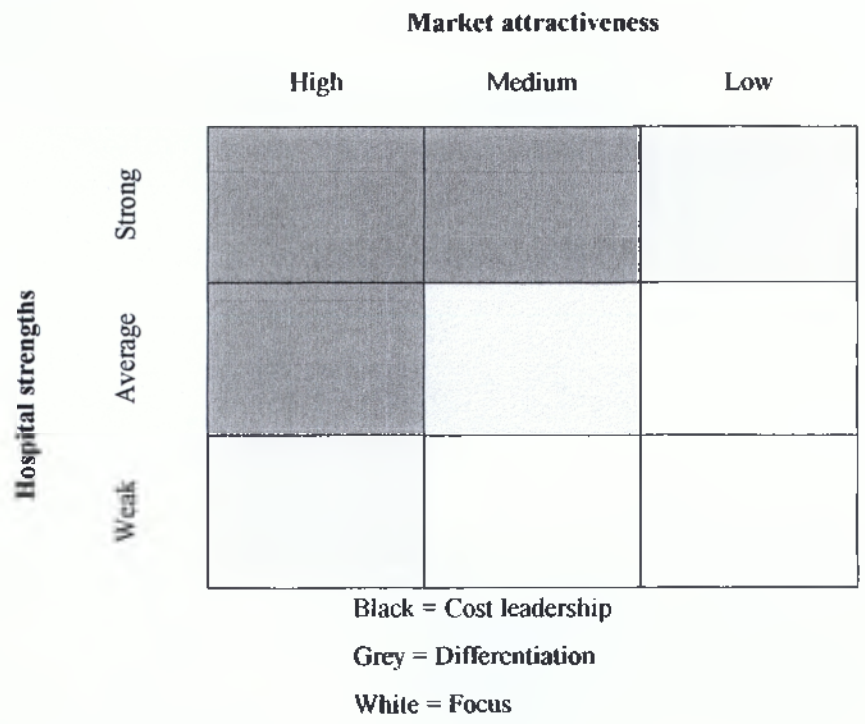
c) The analysis can be done at various operating levels within a hospital, from clinical department and service levels to specific program within a clinical department.

d) Even programs as diverse as obstetrics and plastic surgery, may share important common features that permit comparisons or evaluations along common criteria;

e) Operations of the hospital will be more effective with individualized objectives and strategies for the various departments or services.

FIGURE 2.3

Multifactor matrix



Source: (Ronald L. Zallocco,1984)).

Taken under consideration these assumptions, multifactor matrix model can be operationalized by a six-step process (Rosco,1988):

a) Decide what factors the organization desires or would like to avoid in the services or programs by which it competes.
b) Attach priorities in the form of weights to each of the factors (criteria) selected. These weights should directly reflect the importance of each program with regards to the realization of the objectives and the mission of the organization.
c) Rate each of the projects under consideration by using some numerical scale.
d) Calculate a total weighted score for each proposal under consideration. The total is the weighted score the proposal has received for both the set of market attractiveness criteria and for the organization strengths.
e) Locate the projects on the multifactor matrix. This step requires determining cutoff points for low, medium and high scores for both market attractiveness and organization strengths.
f) Determine strategy. There are three general strategies that can be applied here which are: cost leadership, differentiation and focus.

The model appears to be particularly well suited for analyzing a hospital's portfolio of clinical departments or programs, as well as for evaluating new program opportunities. However, there are some difficulties in the application of this portfolio model. The major limitation of the multifactor matrix is in the possible biasing effect built in, due to the opportunity to tailor criteria for inclusion. The model user should be careful not to include variables that will reinforce a predetermined decision. The problematic questions are how to identify the relevant factors, how to relate these factors to market attractiveness and organization strengths, and how to weighting the factors. Despite these difficulties, there are three reasons that multifactor matrix is the most attractive model for hospital planning. First, it permits the use of several criteria in the process of evaluation of products. Second, the selected criteria can be tailored to the unique needs of the organization and its market. Finally, the multifactor matrix model is useful for both, evaluating new programs, as well as for analysis of already existing programs. Thus, the model is applicable to be used at many stages in the strategic planning process.

The model is useful in the development of general as well as specific hospital strategies. In addition to aiding in the formulation of general strategies, the model provides information useful in developing more specific decisions, such as:

a) Allocation of resources- Services in the strongest positions might have their resources (budgets, labor, service support) expanded, while resources of those in lesser positions are frozen or contracted;

b) Focusing of marketing efforts- With clearly defined strategies, promotional, pricing, distribution and marketing research efforts can be tailored to the needs of each service. Areas of growth might be targeted for more intensive general promotion and candidates for satellite facilities;

c) New service development- The market attractiveness and hospital position relative to proposed services can be determined to aid go/not go decisions and in tailoring new services to meet the needs and competitive conditions of the market;

d) Research and capital expenditures- The model can help in identifying areas that deserve expanded research efforts. It can also help administrators determine which new technology-related equipment to purchase;

e) Non traditional expansion plans- Strong services are likely candidates for new ventures and business expansion, such as backward integration into distribution and supply and forward integration into such areas as urgent care centers and home health care. Services in weak positions are less likely for this kind of expansion.

The hospital administrators should also consider the following when applying this model of portfolio analysis:

a) The analysis should be repeated periodically. The attractiveness of markets and the organization strengths in those markets can change;

b) By analyzing market and organization trends, the future position of programs can be forecast and plotted on the grid;

c) The application of the model to competing hospitals can provide useful insight. The manager can visualize the attractiveness of markets and the strength of competing hospitals from the competing manager's perspective.

This process could provide a glimpse at the likely strategies that competitors will employ for various programs in the future and is useful input in the development of the hospital's own strategies.

2.4.4 The WDG matrix

An alternative approach of the portfolio analysis is the WDG model. In the WDG portfolio model an asterisk-like equidistant axes graphically represent four ratios. The *supply* of hospital services in the community and the consumer *demand* for these services are the competitive environment. In addition to this, two groups of sociopolitical forces, resource leakage and resource assistance are also considered. Resource leakage refers to services and products rendered without payment. Resource assistance includes donations and services that are freely contributed to support a hospital (Godkin,1996).

To apply the WDG model, these environmental elements must be operationalized. This can be done in the following way:

a) Competitive position as a proxy for supply. The inventory figures and personnel hours cannot quantify the supply of a hospital services to consumers. The supply should be rather predicated upon the hospital's investment in technology and professional skills. However the hospital industry has peculiarities regarding competition, supply and demand as well as the entry threats. Therefore a feasible measure of relative competitive position is to use return on assets (ROA). This measure appears as ROA on the WDG model.

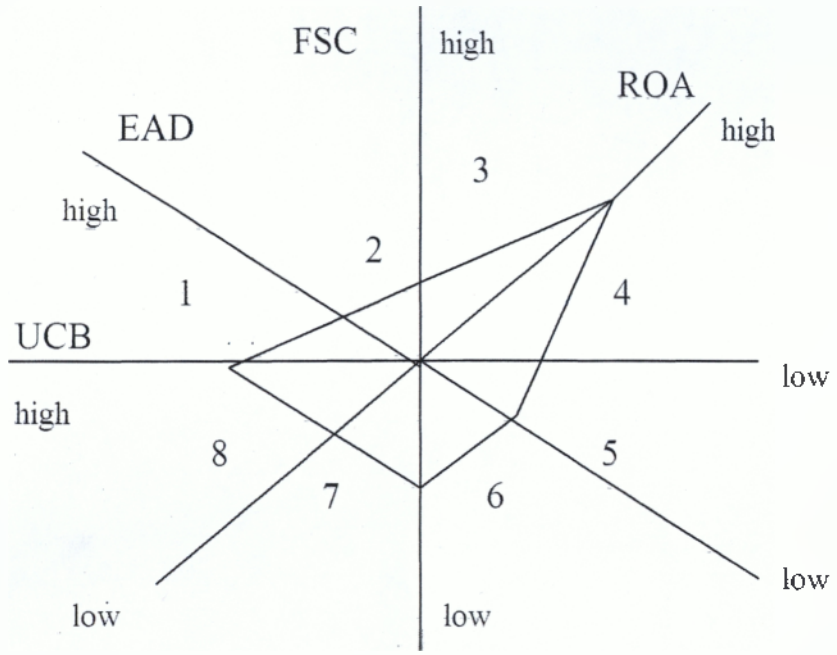
b) Case mix as a proxy for resource demand. In this regard, data representing averaged inflation-adjusted expenses per admission and per patient day should be available. Expenditures per adjusted discharge are noted with EAD on the WDG model.

c) Uncompensated care burden as a proxy for resource leakage. The uncompensated care burden incorporates the net effect of all hospital discounts and allowances for patient, stated as a ratio to total patient revenues. The measure of resource leakage is noted with UCB on the WDG model.

d) Societal support as a proxy for resource assistance. The Financial support consideration (FSC) is often used as a representative measure of societal

support. The FSC can be calculated as the ratio of all consistently reported financial assistance plus estimated tax benefits to total revenue. This measure appears as FSC on the WDG model.

FIGURE 2.4
WDG model



source: (Godkin.L,1996)

The points that represent the position of a hospital service at these polar coordinates are connected to form a "footprint". Thus, the WDG model constructs a two-dimensional footprint from the four-dimensional ratio data. The model's center point, where the four axes intersect, denotes one year's sample means for the four ratios regarding several hospitals. This center point represents the average hospital in a sample of hospitals. The placement of the center point within the footprint produces a common unit of comparison for trend and cluster analyses. The completed WDG model footprint and the center point of that print offer to strategists a view of the hospital situation situational divergence from the average found in the industry environment. The position of the footprint suggests strategic implications for the organization (the WDG approach model presented in figure 2.4).

The ratios themselves suggest that the worst model position would be the one located in the lower left quadrant containing WDGs 7 and 8. In comparison to the average sample hospital (center point), a hospital within that quadrant would likely

have a very low ROA, very high UCB, average to low FSC and average to high EAD. That quadrant indicates the increased likelihood of financial distress. On the other hand, input of favorable ratio values (a high ROA, low UCB, moderate to high FSC and moderate to low EAD) would result in a footprint located in the upper right quadrant, which contains WDGs 3 and 4. In this concept, the hospital administrators can define strategies as a result of the view of the hospital position in its environment

The WDG model has two major limitations, which make it difficult to be adopted from hospital administrators. First, it requires several data from the hospital that is applied as well as from the hospitals that comprise the overall health care market. The collection of this data may be really complicated because small or medium size hospitals may not have available organized data to define the required ratios for the model. Second, the model is not flexible because it is able to evaluate only the position of a hospital within its environment. As a result, hospital administrators that they develop a portfolio analysis to evaluate departments or services provided by a hospital are not able to achieve their purpose adopted the WDG model.

The great advantage of the WDG approach model is its comprehensive nature and focus on the external environment. Empirically based and intuitively appealing, it is suitable for the portfolio analysis in strategic analysis that they are focused at the position of their organization in its external environment. The model is often classified as the best of quantitative and graphic general planning models available. There is, however, room for the model refinement and adoption to particular circumstances.

2.5 Conclusion

Despite the numerous advantages of the portfolio models, mentioned in the previous sections, the portfolio approach has some important limitations. These limitations can be summarized as following (Rosco,1988):

a) Portfolio analysis does not discriminate between projects having different degrees of risk.
b) This portfolio analysis does not systematically consider all of the internal and external environmental factors shaping corporate strategy.

c) Portfolio analysis does not determine whether strategic goals are consistent with financial objectives.

d) Minor changes in defining criteria of the portfolio analysis can result in a different classification of the project.

The strategic planning of a hospital organization is affected by many factors that should be considered by the administrators. There are also external and internal environmental elements that influence the managerial decisions. Therefore, the application of a portfolio analysis model depends on the goals that the organization determines and the future strategy, it will follow. Based on these considerations the multifactor matrix and the WDG model appeared to be most suitable for hospital strategic planning using portfolio analysis. These models take into account a bigger number of factors than the other two models and offer a possibility for comprehensive view at the managerial problems.

As a final note it should be mentioned that portfolio analysis is intended to assist, not to replace, executive judgments. The portfolio analysis provides mechanisms that can help administrators to develop systematic procedures for evaluating the multi-attributed programs and services that their organization provides. If hospital managers become more familiar with the concept of portfolio analysis, they can learn to adjust the portfolio planning models and customize them to serve the specific goals and needs of their institutions.

The weakness of portfolio analysis suggests the need for research in at least two major areas. First research should be conducted to facilitate modification of portfolio analysis to remove the deficiencies. Second, research is needed to establish norms (likely to differ by type of hospital) for project criteria.

Chapter 3. An application of portfolio analysis

3.1 Introduction

To examine the process of portfolio analysis, a multifactor matrix model was applied to develop management strategies for the University Hospital Maastricht (AZM). This model was chosen for the portfolio analysis in the AZM for three major reasons. First, the multifactor matrix model allows us to use several criteria for the evaluation of the services of AZM. This means that contrary to other portfolio analysis, various factors of market attractiveness and hospital strengths such as socio-environmental, financial and organizational skills factors can be included in the portfolio matrix. Therefore, the multifactor matrix model considers a broad view of the factors that can influence the managerial decisions. As a result, a comprehensive view of the managerial problems can be generated. Second, the model offers flexibility with regards to the data required for its application. This advantage makes the collection of the data for the development of a portfolio easier. The third reason for selecting the multifactor matrix model is its ability to fit the unique needs of a hospital. The model can be tailored to the unique problems and characteristics of a hospital to determine feasible future management strategies. As a result of these advantages the multifactor matrix appears to be most suitable for the application of portfolio analysis in a health care organization, such as the AZM.

This chapter first presents a short overview of the hospital setting. The questions that should be answered and the data that should be collected to apply the multifactor portfolio model are then presented. The methods used to collect those data are also described. The chapter concludes by an outline of the multifactor matrix that should be developed.

3.2 The University Hospital Maastricht (AZM)

The AZM is associated with the Maastricht University and maintains close relations with the Faculty of Medicine and the Faculty of Health Sciences. As a university hospital, it plays a role in patient care, education and research, all of which are closely interrelated.

The AZM is active in virtually all medical specialties and sub-specialties, and provides a complete package of ordinary hospital care to patients in Maastricht and

the region. In addition to standard patient care, top referral care also forms an important part of the services provided by the AZM. The provision of top referral care is also accompanied by specialized diagnostics and treatments. In addition to this, the AZM provides advanced clinical care, which requires well-organized interrelated activities, high quality and generally very expensive facilities. Therefore, the population coverage of the AZM extends further than the Maastricht region.

The provision of top referral care and advanced clinical care further requires a close cooperation with the fundamental research at the Faculty of Medicine and an experimental clinical research within the AZM. Some research institutes that the AZM is involved are: Cardiovascular Research Institute Maastricht, Nutrition and Toxicology Research Institute Maastricht, Research Institute for Growth and Development of Cells, Maastricht Brain and Behavior Institute, Maastricht Health Research Institute for Prevention and Care and Institute Experimental Psychopathology.

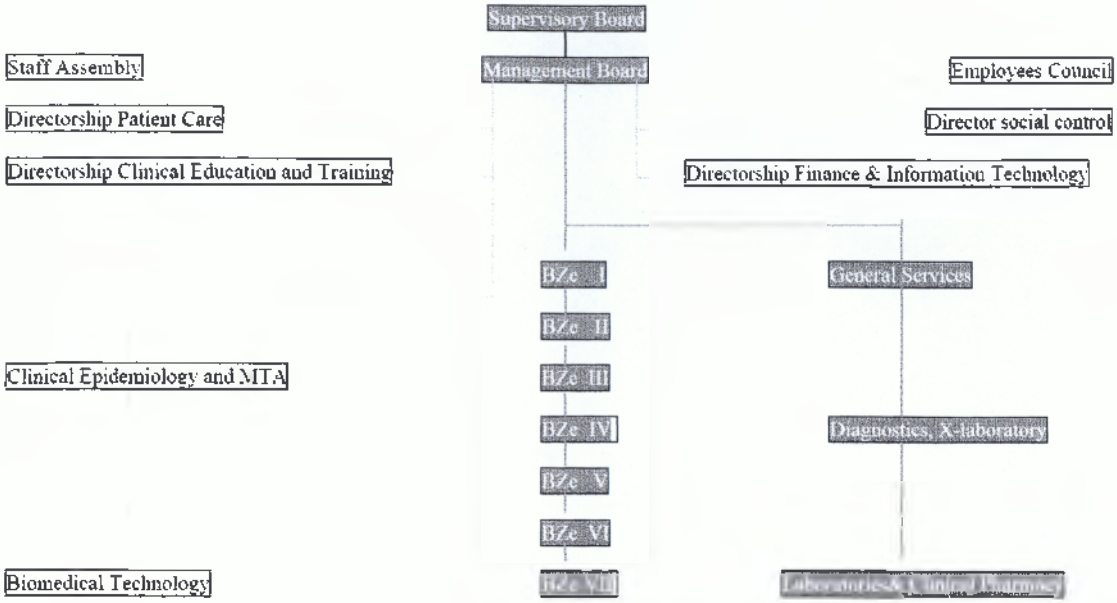
In addition to care provision and research, the AZM plays an important role in the educating and training of both medical and health sciences students in the University of Maastricht. During their training, students work as interns under the guidance of the medical specialists to acquire clinical experience or under the guidance of hospital managers to gain experience in hospital planning and control. This transfer of knowledge is carried out through training programs and courses as well as on an individual basis (AZM,2001).

The main parts of the management structure of AZM included the management board and the management departments of the treatment and cure units (TCU's). The management board presents an outline of the vision, hospital profile and the AZM's objectives for every year. The medical departments' activity plans are the basis of the TCU's annual budget plans. The department head is responsible for drawing up the department's medical activity plan and also coordinates the plan with the associated nursing department. The TCU management supplements the activity plans of the medical and nursing departments with a policy on the functional laboratories within the TCU and on business management. The various plans are then harmonized at TCU level. This is curried out, along with the organizational and financial interpretation, in a single budget, which conforms to the main outlines, as well as the financial and organizational framework set out by the management board. The organization chart of AZM is presented on chart 3.1.

The funding for the patient care that AZM provides is generated by the insurance companies in accordance with the government legation, as well as by the Ministry of Education, Culture and Science in a form of a supplementary government grant. The insurance contributions cover the costs of care while the government grant is intended to cover the cost of the infrastructure, staff and equipment needed to maintain the functioning of the hospital. Some of the arrangements for funding between AZM and insurance companies are made according to a new health care financing system, which makes use of so called Diagnosis Treatment Combinations (DBCs). Each DBC specifies all medical activities required from the moment the patient first consults the doctor to the final check-up. A DBC includes both outpatient and inpatient activities. For each DBC, there is a locally agreed charge comprising the hospital costs and the fee of the medical specialist. The introduction of the DBC system is still not complete. For the 2003 budget, the insurance companies and the hospital have already made agreements regarding 17 specific operations and interventions, which have resulted in approximately 100 DBCs (AZM,2002).

At present, the AZM has 715 beds including day care beds. There are 22 operating theaters, of which seven are used for day surgery. Around 22.000 patients are admitted to the hospital every year. The average stay is 9 days. The outpatient departments deal with an average of 345.000 patients annually. The annual budget is approximately 250 million euros of which 15% comes from the Ministry of Education, Culture and Science and the rest 85% comes from the public and the private insurance funds. With over 4.000 employees, the AZM appears to be the largest employer in the Maastricht region and one of the biggest hospitals in the Netherlands(Carpay,1998).

Chart 3.1 Organization chart of AZM



BZe (health care unit)	**Medical department**
BZe I	Anesthesiology
BZe II	Dental surgery Otorhinolaryngology Ophthalmology Pediatrics Obstetric/ gynecology
BZe III	Cardiology Pulmonology Cardiopulmonary surgery
BZe IV	Surgery Orthopedics Plastic surgery Urology Dermatology
BZe V	Internal medicine Neurology Neurosurgery Clinical neurophysiology Rehabilitation
BZe VI	Psychiatry Medical psychology
BZe VII	Transmutable pharmacy/ care Diagnostic center Social work Palliative care General practitioners Scientific investigation

(BZe in English is TCU, which means treatment and cure unit) (AZM,2002)

3.3 Operationalization of the portfolio model

To apply a multifactor portfolio model, it is first necessary to operationalize this model. The process of operationalization includes the selection of services to be analyzed, selection of criteria to evaluate the services, and identification of rating and weighting procedures. Before starting the operationalization of the multifactor model in AZM, it was considered necessary to construct a timetable with the time frames of each step. Based on this, a logical schedule was followed in order to apply the multifactor model in AZM within the predetermined time. The timetable that was used is presented in Appendix A. The steps for the operationalization of the multifactor model are discussed bellow.

3.3.1 Selection of services

The first step in the construction of a multifactor matrix, is to define the hospital services that will be involved in the portfolio analysis and for which a management strategy should be developed. The services can be provided by different hospital departments or can be services of a single hospital department. Alternatively, they may be activities of a specific service that a single department provides. Furthermore, the portfolio analysis can be concerned with both, services that the hospital already provides and services, which the hospital expects to provide in future. This flexibility of the portfolio analysis offers an opportunity to define management strategies for various types of hospital services and to prepare a complete plan for strategic development. The study reported here, was focused on the services currently provided by one of the hospital departments–BZe IV, namely the orthopedic services.

To select the services, two important limitations of the portfolio analysis were considered. The first limitation considered was related to data required for the application of the portfolio model. Apparently, services for which the data are insufficient or unavailable can not be evaluated in a portfolio analysis. The second limitation concerned the co-operation of the hospital personnel involved in service provision (e.g. physicians, nurses, technicians). If the medical personnel lack interest in the portfolio process, its application can become complicated. Even if the personnel show interest, the limited time that hospital employees are able to dedicate to the portfolio analysis, and the shortage or absence of certain specialists can threaten the quality of the portfolio data.

Thus, the selection of services for portfolio analysis in the AZM was made under the consideration of these limitations. First, it was determined for which existing services there were readily available data and it was easy to collect new data. Second, the co-operation of the medical personnel was requested. As a result, the activities of orthopedic service of BZe IV were selected as the products of AZM to be evaluated in the portfolio analysis. In addition to this considering the priorities of the department, knee surgery, hip surgery and arthroscopy appeared to be the most suitable activities for the application of the multifactor matrix model to AZM.

3.3.2 Selection of criteria for evaluation

The second step in the operationalization of the multifactor matrix model is to select a set of criteria for the evaluation of the hospital services. The aim of this step is to define indicators of market attractiveness and hospital strengths necessary for the portfolio analysis. Regarding the market attractiveness, the organization should consider factors that it would find desirable (or would like to avoid) in the service market. There are five major categories of criteria for market attractiveness that can be considered. These are:

a) market characteristics;
b) competitive intensity;
c) financial factors;
d) technology;
e) socio-environmental factors.

Each of these categories includes multiple criteria that indicate the market attractiveness of a hospital services. Regarding the criteria of hospital strengths, the organization should consider factors associated with successful (or unsuccessful) service provision. Six major categories of criteria for hospital strength can be identified:

a) program quality;
b) centrality to mission;
c) market effectiveness;
d) differentiation;
e) organizational skills;
f) financial factors.

These categories include multiple criteria that indicate whether the hospital show strengths in proving the services.

In principle, it is not necessary to select all criteria for market attractiveness and hospital strengths. The aim is to isolate those criteria, which would make complete profile of the market attractiveness and hospital strengths. The list of the evaluation criteria can be adjusted according to the objectives of the portfolio analysis. A list of possible criteria for market attractiveness and hospital strength is presented on figure 3.1.

Because the establishment of evaluative criteria reflects the importance of each characteristic in realizing the objectives and mission of the hospital, top managers and financial stuff should be directly involved in the selection process. Moreover, the availability of data for each criterion should be considered. Certainly, criteria that require already available data are preferred than those for which data collection is difficult or impossible. Therefore, a plan of data required for the evaluation of each criterion can help the selection process. During the construction of this plan, it should be determined the method for evaluation of each criterion and the data that are required for the application of this method. Based on this plan and with the assistance of the hospital management stuff, the most suitable criteria for evaluation can be selected. Such criteria would meet the specific needs of each individual institution, i.e. the hospital, and should serve the development of appropriate management strategies.

Based on the considerations for selecting criteria described above, an evaluation of criteria for the application of the multifactor matrix in the AZM was determined. The criteria included the following indicators of market attractiveness: growth rate, profit, size of the market and reimbursement policy. For hospital strength the following criteria were selected: capacity utilization, efficiency, availability of professional staff and relative product quality. After a discussion with hospital management, these criteria appeared to be the most suitable for the hospital needs and data availability in the AZM.

FIGURE 3.1
Criteria list

Market Attractiveness

Size of industry (the number of clients who need the service)
Vulnerability (the historical volatility of the prices of inputs used in production of service)
Capital intensity (the magnitude of new capital expenditures required to enter the industry)
Availability of personnel (the number of specially trained personnel required to provide the service)
Prestige (how the service affects the image of the hospital with relevant constituents i.e. physicians, patients, governing board, staff)
Congruence with corporate mission (the extent to which the service adds to or detracts from the accomplishment of department goals)
Governmental regulations (the restrictiveness of and the cost of compliance with government regulations)
Price sensitivity (the likely impact of price changes to demand)
Technical problems (the complexity of the equipment or procedures required to provide the service)
Potential for lawsuits (the riskiness of the service for generation of lawsuits)
Reimbursement policy (the depth and the extent of insurance coverage for the service as well as implications of the payment policies of the third parties)
Life span of technology (the maturity of the technological equipment)
Economies of scale (the concept that the average unit cost of a service can be reduced by increasing the output rate)
Legal (statutes and regulations that would prohibit or limit the provision of the service, 0 or 1)
Social (how controversial the project is to the organization's important interest groups, 0 or 1)
Environmental policy (the conformity of the project with various environmental standards, as well as the impact on the organization's neighborhood and/or service area, 0 or 1)
Growth rate (the average of the percentage changes in the volume of services provided during the past three years)
Profit (the excess of revenues over expenses)

Hospital Strengths

Market share (the ability of the capture a significant market share in the industry segment under consideration)
Professional staff (the availability and relative quality of professional staff e.g. nurses, technicians, necessary for operation of the service)
Physician staff (the availability and relative quality of managerial staff necessary for operation of the service)
Managerial staff (the availability and relative quality of managerial staff necessary for operation of the service)
Accessibility to the market (the degree to which various market segments relevant to the service are geographically, socially and financially accessible to the hospital)
Ability to acquire funding (the availability of funding for the service from both internal and external sources)
Strength of competitors (the relative strength of competitors in the hospital's market area)
Easy of entry (barriers to market entry by the hospital, including potential legal, financial and political roadblocks)
Location of facilities (the relative location of facilities available to the service)
Newness of facilities (the relative age of facilities available to the service)
Relative product quality (the overall quality of current services delivered by the hospital's ability to compete for patients, physicians, professional and managerial staff and other hospital resources)
Capacity Utilization (the degree to which equipment, space or labour is used when providing a service)
Efficiency (the inputs necessary to deliver a service compared to a standard input quantity)

3.3.3 Defining the weighting and rating procedures

The third step in the portfolio analysis requires defining the procedure to weight the criteria and to rate the services that have been selected in the previous steps.

The aim of the weighting procedure is to determine the relative importance of each criterion. Not all criteria that comprise market attractiveness and hospital strength are equally important to all employees. Their importance is expected to vary also among hospitals, but we limited ourselves to the employees of the AZM.

The literature suggests several weighting methods of criteria. In the portfolio analysis one straightforward approach is to weight the criteria according to their importance to the respondents on a scale from 1(very unimportant) to 5 (very important). It was considered that the major pitfall of this weighting process could be that the hospital personnel could mark all criteria as "very important". There were two major reasons for this expectation. First, to fill the questionnaire as quickly as possible and second because they would not be asked to trade off between the evaluation criteria. To avoid these biases, we applied a different weighting procedure. We asked the respondents to distribute 100 points among the evaluation criteria in accordance to the importance they attached to these criteria. Based on this weighting procedure, the importance in each set of criteria (market attractiveness or hospital strengths) would sum up to 100 with the most important criterion in each set receiving the highest weight and the least important receiving the lowest importance weight.

After determining the relative importance of the criteria, the next step in the portfolio analysis is to rate each service selected for the portfolio analysis according to their importance to the hospital. A scale ranging from very unattractive to highly attractive was used, similar to previous portfolio analysis reported in the literature. However, in contrast to other study where the rating scale was represented by numbers from 1 to 5, our rating scale ranged from –3 (extremely low importance) to 3 (extremely high importance). The reason for selecting this rating scale was the following. On one hand, it was expected that the rating of the services would be more interesting for the respondents and on the other hand it was expected that the respondents would be more concentrated when filling the questionnaire.

3.3.4 Estimation of the values of the criteria

At this step of portfolio analysis, the values of the criteria that have been selected for the portfolio analysis should be estimated. For this purpose we first define the formulas for the calculation of each criterion as well as the data required to calculate the values of each criterion. It was considered that for some of the criteria, alternative calculation procedures were possible. The estimation of the values of each criteria set (market attractiveness or hospital strengths) is described below.

Criteria for market attractiveness

- *Growth rate* is the average percentage changes in the volume of services provided during the past three years, as percentages. To evaluate the growth rate of a service, three alternatives were considered. These were a) the annual visits during the past three years, b) the annual patient days during the past three years, or c) the annual admissions during the past three years for each of the services evaluated.

For example:

$\rho 1$ = admissions in 2001, $\rho 2$ = admissions in 2002, $\rho 3$ = admissions in 2003

The growth rate is given by the following formula:

$$\text{Growth rate} = \frac{(\rho 2/\rho 1)+(\rho 3/\rho 2)}{2} \times 100$$

- *Profit* is the excess of revenues over expenses. For the calculation of the value of this criterion alternative options were considered.

The first option involved the net income per unit given by the following formula:

$$\text{Net income per unit} = \text{Pu} - (\text{TICu} + \text{TDCu})$$

The data required for the evaluation of this formula are: the price per unit (Pu), the total indirect costs per unit (TICu) and the total direct costs per unit. The Pu can be estimated as a sum of the amount per unit paid by the insurer, amount per unit paid by the patient and amounts per unit paid by other parties. The methods for the evaluation of TICu are presented in Appendix B. The data required for the calculation of TDCu

included: a) the cost of labor per unit, b) the cost of materials per unit and c) other direct costs per unit.

The second option for the evaluation of the profit involved the contribution margin per unit, which is given by the formula:

$$\text{Contribution margin per unit} = Pu - TVCu$$

The data required for the evaluation of the contribution margin per unit are: a) the Pu calculated the same way as described above and b) the total variable cost per unit (TVCu) which included cost that vary with the quantity of services delivered.

- *Size of the market* is the percentage of the delivered treatments of AZM compared to the overall treatments delivered in the region. To calculate the size of the market in the AZM, the annual number of patients in the region of Limburg per service in 2003, was considered.

- *Reimbursement policy* refers to the extend of the insurances coverage for a given hospital service. The data required to calculate the value of this criterion was already estimated for the price per unit for the profit criterion. The value of the reimbursement policy was the percentage of the price per unit covered by the insurance companies.

Criteria for hospital strengths

- *Capacity utilization* is the degree to which equipment, space or labour is used when providing a service. The formula to measure the capacity utilization is:

$$\text{Capacity utilization} = \frac{\text{Average output}}{\text{Maximum capacity}} \times 100$$

The maximum capacity was selected to refer to the effective capacity, i.e. the highest level of output the hospital can reasonably sustain by using realistic employee work schedules and the equipment currently in place. There were three alternative data sets required to calculate this formula. These included: a) the average units

delivered per day/week/month and the maximum units delivered per day/week/month; b) the average operation hours per day/week/month and the maximum operation hours per day/week/month; c) the average labor hours per day/week/month and the maximum labor hours per day/week/month.

- *Efficiency* is determined by a comparison between the inputs necessary to deliver a service compared to a standard input quantity. The efficiency was measured by the efficiency variance calculated using the following formula:

$$\text{Efficiency variance} = \left[\begin{array}{l}\text{Inputs that}\\ \text{should have}\\ \text{been used}\end{array} - \begin{array}{l}\text{inputs}\\ \text{actual}\\ \text{used}\end{array}\right] \times \left[\begin{array}{l}\text{standard}\\ \text{unit}\\ \text{price}\end{array}\right]$$

$$= \left[\begin{array}{l}\text{standard allowed}\\ \text{materials or labor hours}\\ \text{for good output}\end{array} - \begin{array}{l}\text{actual}\\ \text{materials or}\\ \text{labor hours}\end{array}\right] \times \left[\begin{array}{l}\text{standard}\\ \text{unit price}\\ \text{of inputs}\end{array}\right]$$

The three alternative data sets required to evaluate the efficiency of each service were: a) average operation hours per unit, standard operation hours per unit and standard unit cost of using the operating room; b) average labor hours per unit, standard labor hours per unit and standard unit cost of labor; or c) average machine hours per unit, standard machine hours per unit and standard unit cost of using a machine.

- *Availability of professional staff* is the number of physicians, nurses or technicians trained to provide a service. The data required to evaluate the value of this criterion is the number of the personnel in each of these stuff categories that specialized in providing each of the services evaluated in the portfolio analysis.

Relative product quality is the overall quality of a service delivered by the hospital and how this pattern contributes to the hospital's ability to compete in its market. To measure this criterion, the percentage of the effectively cured patients per service was determined. Thus, for the calculation of the value of this criterion, the total number of patients per service and the number of the successful treatments was required.

3.4 Collection of data

After the portfolio is operationalized, it is necessary to collect the data required. The data collection procedure consists of three stages: collection of data about the values of the criteria, preparation of questionnaire and collection of data regarding the weighting/rating of the criteria and the services.

3.4.1 Collection of data regarding the values of the criteria

To collect the data for the values of the criteria, meetings with the financial controllers of the AZM were arranged. During these meetings the availability of the data was discussed. As it was mentioned above alternatives for data required were considered. Every hospital has its own data basis organized depending on the needs and the external and internal environment where it provides the health care services. It appeared that some data required were not available. Therefore, one of the alternative options was considered.

In principle, the financial controllers of a hospital have very strict and heavy schedule within a working day. Therefore, to collect the data for the evaluation of the criteria was decided to prepare a questionnaire in a form of table with the data required to apply the multifactor model in the AZM. The table is presented in Appendix C1.

3.4.2 Preparation of the questionnaire regarding the rating procedures

To collect the data regarding the weighting of the criteria and rating of the hospital services a questionnaire was developed. The questionnaire was written in English, since the researcher and the hospital personnel involved in the portfolio analysis had good communication skills in English.

The questionnaire consisted of nine entries, categorized into three broad categories:

- Part 1 contained two questions concerned with the weighting of the criteria. The first question is related to the criteria of market attractiveness and the second one to the criteria of hospital strengths.
- Part 2 consisted of three questions about the rating of the hospital services (one question per service).

- Part 3 included four questions regarding the socio-demographic characteristics of the respondent.

The questionnaire used for the application of the portfolio model in the AZM is presented in Appendix C2.

Two difficulties were faced during the preparation of the questionnaire. First, the respondents were hospital employees with different occupation background. The information about market attractiveness and hospital strength was not equally meaningful to them. Therefore, the criteria were described in the questionnaire to assure the comparability of the responses. Short definitions of the questionnaire terminology used, were presented in Part 1 of the questionnaire. Moreover, the definitions were discussed with the medical personnel prior to the survey to adjust their wording. The second difficulty was to modify the questions in order to avoid biases. Therefore, the wording of the questions was discussed with experts and potential respondents.

A very important aspect that was taken into consideration during the preparation of questionnaire was the limited time that the hospital personnel could spend to fill in the questionnaire. Therefore, the questionnaire was made as short as possible. The pretests of the questionnaire showed an average time of ten minutes necessary to answer all the questions.

For the distribution of the questionnaire a web page was constructed in which the respondents had the ability to submit their answers. A database was organized in order to collect and present automatically the submitted answers. The link for this web page was sent to the respondents via e-mail. The e-mail included also the aim of the questionnaire, a short introduction of portfolio analysis and instructions in order to fill out the questionnaire. Using this electronic method for the distribution of the questionnaire, the disturbance of the respondents during their working time was avoided.

3.4.3 Selection of the sample involved in the weighting and rating procedures

As mentioned above, the questionnaire was sent to employees of the AZM via e-mail. The e-mail addresses of the respondents were selected from the intranet of AZM where some data of the employees were available. The answers of the respondents were collected in a database immediately after their submission. The occupation categories that were involved in the survey were orthopedists, physicians, nurses,

managers and financial controllers. Totally 25 questionnaires were sent. The Response rate was 56 %.

3.5 Conclusion

In this chapter, the steps necessary to operationalize the multifactor matrix model for the AZM were discussed as well as the collection of the data required to develop the multifactor matrix. This phase appeared to be most crucial for the adequate application of the portfolio analysis. The steps described in this chapter, involved various choices. An attempt was made to avoid biases and pitfalls. However, the purpose was to prepare the development of a feasible multifactor matrix usefully to define future strategies in the AZM.

Chapter 4 Data analysis results

4.1 Introduction

After the data necessary for the construction of the multifactor matrix are collected, the next step in the portfolio analysis is to analyze the data and consequently to develop the matrix. In this chapter, the values of the criteria are calculated and the results of the questionnaire that had been distributed among the employees of AZM are analyzed. Finally, the location of the services on the multifactor matrix is illustrated.

4.2 Estimation of the values of the criteria related to market attractiveness

The data regarding the estimation of the values of the criteria are collected by interviews with the financial controllers as well as with medical and managerial staff of the AZM. At this step, it is presented the analysis of the results and the calculation of the values of the criteria and their results. The definitions of the criteria have been given already in Chapter 3. The process of the calculation of each criterion is presented bellow:

- **Service growth rate**. To calculate this criterion, the annual admissions during 2001, 2002 and 2003 for each service are considered. The calculations of the service growth rate in case of knee surgery, hip surgery and arthroscopy are presented analytical below:

Table 4.1: Annual admissions of the services during last three years

	Knee surgery	Hip Surgery	Arthroscopy
p1	178	355	548
p2	151	337	552
p3	146	349	550

Service growth rate (PA)

Knee surgery:

$$PA = \frac{(\rho 2/\rho 1)+(\rho 3/\rho 2)}{2} \times 100 = \frac{(151/178)+(146/151)}{2} \times 100 = 90{,}7\%$$

Hip surgery:

$$PA = \frac{(\rho 2/\rho 1)+(\rho 3/\rho 2)}{2} \times 100 = \frac{(337/355)+(349/337)}{2} \times 100 = 99{,}2\%$$

Arthroscopy:

$$PA = \frac{(\rho 2/\rho 1)+(\rho 3/\rho 2)}{2} \times 100 = \frac{(552/548)+(550/552)}{2} \times 100 = 100\%$$

The results above show that the arthroscopy has the highest growth rate. Consequently, according to this criterion arthroscopy is the most attractive for the AZM. This service has 100% growth rate, which means that the same number of admissions remains relatively constant. In addition, the other two services have growth rate lower than 100%, which suggests that the admission of patients for these services is decreasing. Yet, the hip surgery has the second higher growth rate, which is 99,2%. The knee surgery is third with 90,7%. The knee surgery, according to its growth rate during the period considered in this survey, has approximately 10% less patients every year. Therefore, this service has the lowest market attractiveness for the AZM with regards to the growth rate.

- **Profit.** To estimate the profit of each service, as a criterion of market attractiveness, the indicator contribution margin per unit is calculated. The data are presented in table 4.2. The procedure for calculation of the contribution margin per unit of each service is presented below:

Table 4.2 Data concerning the contribution margin per unit

		Knee surgery	Hip surgery	Arthroscopy
Total variable direct costs	Materials	€6.332	€5.554	€280,92
	Labour	€1.077	€973	€442,06
	Price	€9.090	€7.570	€1.000 (assumption)

Contribution margin = Π
Price per delivered unit = Pu
Total variable/direct cost = TVDC

Knee surgery:

$\Pi = Pu - TVDC = 9.090 - 7.409 =$ €1.681

Hip surgery:

$\Pi = Pu - TVDC = 7.570 - 6.527 =$ €1.043

Arthroscopy:

$\Pi = Pu - TVDC = 1.000 - 722,98 =$ €277,02

The knee surgery appears to be the service with the highest contribution margin, €1.681. This fact implies that the knee surgery is the service with the highest market attractiveness according to the criterion profit. The more generated profit, the higher is the market attractiveness. The next higher contribution margin is €1.043 and the last one is the arthroscopy with € 277,02.

- **Size of market.** Based on the data presented in table 4.3 the calculation of the value of this criterion for the three evaluated services is given as follows:

Table 4.3: Annual patients in 2003 in the region of Limburg

	Knee surgery	Hip Surgery	Arthroscopy
Annual in the AZM	146	349	550
Annual in the hospital of Heerlen	384	413	1.172
Annual in the hospital of Sittard	700	700	1.000

Size of market = M

Annual patients in 2003 in the region = π

Annual patients in 2003 in AZM = ν

Knee surgery:

$$M = \frac{\nu}{\pi} \times 100 = \frac{146}{1.230} \times 100 = 11{,}87\%$$

Hip surgery:

$$M = \frac{\nu}{\pi} \times 100 = \frac{349}{1.462} \times 100 = 23{,}87\%$$

Arthroscopy:

$$M = \frac{\nu}{\pi} \times 100 = \frac{550}{2.822} \times 100 = 19{,}49\%$$

The results of the market size criterion show that the hip surgery (23,87%) has the highest percentage among the three evaluated services. This means that the AZM has captured a big part of the market for hip surgery. Thus, with respect to the market size, this service is considered as the one with the highest market attractiveness than the knee surgery (11,87%) and arthroscopy (19,49%).

- **Reimbursement policy.** The criterion reimbursement policy was defined as the percentage of the price per unit covered by the insurance companies. The higher the percentage covered by the insurance, the more attractive is the service. The services evaluated are included in the hospital's DBCs and their price is fully covered by the insurance companies. As a result, the values of the reimbursement policy of the three evaluated services were 100%. This fact has two important implications. From one point of view, the patients are not paying for the service provided, which suggests that the demand is not restricted for monetary reasons. From another point of view, the higher the service coverage by the insurers, the lower is the risk of loosing revenue, due to inability of the patients to pay.

4.3 Estimation of the values of the criteria related to hospital strengths

- **Capacity utilization**. To calculate the value of this criterion during the application of the multifactor portfolio model in AZM, the operation hours per an operating day are considered.

The data for the calculation of the capacity utilization of the three services are given in table 4.5.

Table 4.5: Actual and standard operation hours per day

	Knee surgery	Hip surgery	Arthroscopy
Average operation hours per day	7,20	7,20	3,06
Maximum operations hours per day	8	8	5

Capacity utilization $= C$

Average operation hours per day $= \kappa$

Maximum operation hours per day $= \lambda$

Knee surgery:

$$C = \frac{\kappa}{\lambda} \times 100 = \frac{7,2}{8} \times 100 = 90\%$$

Hip surgery:

$$C = \frac{\kappa}{\lambda} \times 100 = \frac{7,2}{8} \times 100 = 90\%$$

Arthroscopy:

$$C = \frac{\kappa}{\lambda} \times 100 = \frac{}{5} \times 100 = \%$$

The knee and hip surgery have equal capacity utilization, which is 90%. This means that the output rate of these two services can be increased by 10%. The output of the arthroscopy is 61,20 %.

- **Efficiency.** As an indicator of the efficiency were considered the efficiency variance. The data is presented in table 4.5. The calculations of the values concerning this criterion are as follows:

Table 4.5: Actual and standard hours per unit

	Knee surgery	Hip surgery	Arthroscopy
Average operation hours per unit	2,70	2,40	0,45
Standard operation hours per unit	3	2,50	1
Standard unit cost of using an operating room	€1.058	€1.058	€301

Efficiency variance = E
Average operation hours per unit = φ
Standard operation hours per unit = ψ
Standard unit cost of using an operation room = κ

Knee surgery:

$$E = (\psi - \varphi) \times \kappa = (3 - 2{,}7) \times 1.058 = 0{,}3 \times 1.058 = €317{,}40$$

Hip surgery:

$$E = (\psi - \varphi) \times \kappa = (2{,}5 - 2{,}4) \times 80 = 0{,}1 \times 1.058 = €105{,}80$$

Arthroscopy:

$$E = (\psi - \varphi) \times \kappa = (1 - 0{,}45) \times 301 = 0{,}55 \times 301 = €165{,}55$$

According to the efficiency criterion, the service that has the lowest efficiency variance presents the highest hospital strength. The hip surgery that has efficiency variance of €105,80 presents the highest hospital strength. The knee surgery has efficiency variance of €317,40 and as a result presents a lower hospital strengths than the hip surgery and the arthroscopy (€165,55).

- **Availability of professional staff** is considered to be the number of available physicians trained to provide a given service. The data used to calculate this criterion are given in table 4.7.

Table 4.7: Physicians available to provide a given service

	Knee surgery	Hip Surgery	Arthroscopy
Number of physicians	5	5	3

The results shows that the availability of physicians trained to provide the knee and hip surgery are equal. This means that these two services have higher hospital strengths than the arthroscopy, for which only 3 trained physicians are available.

- **Relative product quality**. To measure the relative product quality the percentage of the effectively cured patients per service are considered. The data for the calculation of the values of this criterion according the three services are presented in table 4.8. The calculation procedure is as follows:

Table 4.8: Quality of annual delivered treatments

	Knee surgery	Hip surgery	Arthroscopy
Annual delivered treatments	146	349	550
Annual successful treatments	144	338	547

Relative product quality = Σ
Annual delivered treatments in 2003 = ϑ
Annual succesful delivered treatments in 2003 = ε

Knee surgery:

$$\Sigma = \frac{\varepsilon}{\vartheta} \times 100 = \frac{144}{146} \times 100 = 98{,}63\,\%$$

Hip surgery:

$$\Sigma = \frac{\varepsilon}{\vartheta} \times 100 = \frac{338}{349} \times 100 = 96{,}85\,\%$$

Arthroscopy:

$$\Sigma = \frac{\varepsilon}{\vartheta} \times 100 = \frac{547}{550} \times 100 = 99{,}45\,\%$$

Thus, the service with the highest relative product quality determines the highest hospital strengths as well. The arthroscopy has relative product quality of 99,45% and it is therefore, the service with the highest hospital strengths. The second service in this rank-order is the knee surgery with quality rate of 98,63% and finally the hip surgery with 96,85% quality rate.

The values of the criteria for all three services are summarized in Table 4.9.

Table 4.9: Values of the criteria

	Knee surgery	Hip surgery	Arthroscopy
Growth rate	90,76%	99,25%	100%
Profit	€1.681	€1.043	€277,02
Size of market	11,87%	23,87%	19,49%
Reimbursement policy	100%	100%	100%
Capacity utilization	90%	90%	61,20%
Efficiency	€317,40	€105,80	€165,55
Availability of professional staff	5	5	3
Relative product quality	98,63%	96,85%	99,45%

4.4 Results of the weighting and rating procedure

The data collected by the questionnaire distributed among the hospital employees, are used to weight the criteria and to rate the evaluated services. The first 8 entries of the questionnaire are related to the weighting procedure and the following 3 entries are related to the rating of the criteria. The rating scale at the questionnaire was determined from –3 to 3. This scale was transformed in order to avoid negative numbers at the results of the rating procedure and consequently to the multifactor matrix in a scale from 0-6. To analyze the answers of the questionnaire the mean, the standard deviation and the median of each entry are calculated. The results of the weighting and rating procedures are presented below in tables 4.10 and 4.11.

Table 4.10: The results of the weighting procedure

	Criteria							
	Market attractiveness				Hospital strengths			
	Growth rate	Profit	Size of market	Reimburse ment policy	Capacity utilization	Efficiency	Availability of personnel	Relative product
Mean	25,571	25,429	25,071	24,643	26,115	25,462	22,654	28,077
Std. Dev.	12,005	10,218	10,418	18,838	16,571	9,638	10,570	11,249
Median	25	26,5	25	22,5	22	26	25	26,5
Missing (n)	0	0	0	0	1	1	1	1

Table 4.2: The results of the rating procedure

	Services		
	Knee surgery	Hip surgery	Arthroscopy
Mean	2,615	2,692	2,231
Std. Dev.	1,758	1,843	1,166
Median	3	3	3
Missing (n)	1	1	1

The next step is to calculate the total weights of the weighting and rating procedures. This is done by multiplying the mean of the criteria by the mean of the services. During this procedure, the weight of the criteria and the service ratings are related. For example, to define the total weight of the growth rate of the knee surgery (66,879), the mean of the growth rate (25,571) is multiplied by the mean of the knee surgery (2,615) (see table 4.11). The complete results are presented in table 4.12.

Table 4.12: The total weights of the weighting and rating procedures

	Services		
Criteria	Knee surgery	Hip surgery	Arthroscopy
Growth rate	66,879	68,846	57,044
Profit	66,505	68,462	56,725
Size of market	65,571	67,500	55,929
Reimbursement policy	64,451	66,346	54,973
Capacity utilization	68,302	70,311	58,257
Efficiency	66,592	68,550	56,799
Availability of professional staff	59,249	60,991	50,536
Relative product quality	73,432	75,592	62,633

4.5 Calculation of the total scores

The last calculation step is to relate the results from the calculation of the values of the criteria with the total weights of the weighting and rating procedures. In order to achieve this relation of the two evaluations, the values of the criteria and their total weights are multiplied. For example the value of the growth rate of the knee surgery is 90,76% and its total weight is 66,879 (see table 4.12). The market attractiveness of the knee service with regards to its growth rate is: 90,76% * 66,879=60,700

Next, the criteria concerning the market attractiveness of each service are summed up in order to determine a total score. The same is done with regards to the hospital strengths to determine a total score of hospital strengths of each service. The total scores are also presented in table 4.13.

Table 4.13: The total scores of market attractiveness and hospital strengths

	Knee surgery	Hip surgery	Arthroscopy
Growth rate	60,700	68,327	57,149
Profit	111.795,736	71.405,385	15.714,036
Size of market	7,783	16,113	10,900
Reimbursement policy	64,451	66,346	54,973
MARKET ATTRACTIVENESS	**111.928,670**	**71.556,170**	**15.771,184**
Capacity utilization	61,472	63,280	35,654
Efficiency	21.136,211	7.252,621	9.403,044
Availability of professional staff	296,243	304,956	151,607
Relative product quality	72,426	73,209	62,292
HOSPITAL STRENGTHS	**21.566,351**	**7.694,066**	**9.652,596**

4.6 The multifactor matrix

The results of the final calculation procedure are used to prepare the multifactor portfolio matrix. The matrix consists of nine cells. The horizontal axis illustrates the market attractiveness and the vertical axis presents the hospital strengths of the services. Each axis has two cut-off-points that determine the levels of the hospital strengths (weak, average, strong) and the market attractiveness (low, medium, high). The matrix developed in this survey is presented in figure 4.1. The size of the circle represents the potential revenue generated by each service. The revenue size is calculated by multiplying the annual admissions in 2003 (see table 4.1) with the price per unit delivered (see table 4.2). The calculations of the revenues are presented below:

Knee surgery:

$$\text{Annual revenue} = \rho 3 \times \text{Pu} = 146 \times 9.090 = €1.327.140$$

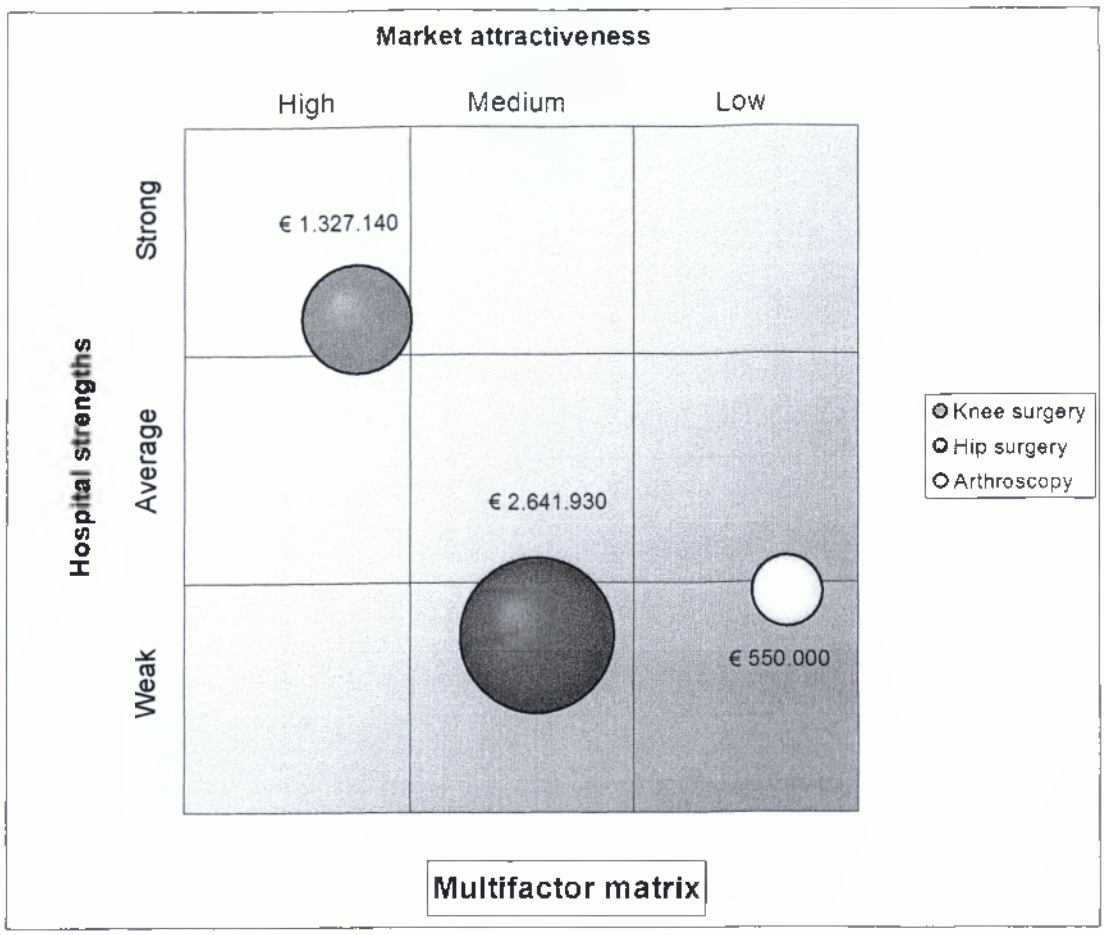
Hip surgery:

$$\text{Annual revenue} = \rho 3 \times \text{Pu} = 349 \times 7.570 = €2.641.930$$

Arthroscopy:

$$\text{Annual revenue} = \rho 3 \times \text{Pu} = 550 \times 1.000 = €550.000$$

Figure 4.1: Multifactor portfolio matrix



4.7 Interpretation of the results and conclusion

The results of the multifactor matrix provide possibility to discuss the attractiveness of the services included in the portfolio analysis. The location of each service in the multifactor matrix offers the opportunity to understand the overall strengths and weaknesses of these services. The graphic of the multifactor matrix on figure 4.1, is designed with dark colour at the lower right area, where the market attractiveness and hospital strengths are low. Additionally, the favorable zone is designed with light colour. Thus, the differences in the pattern of the matrix design can be use to make comparison regarding the attractiveness of knee surgery, hip surgery and arthroscopy for the AZM

Based on the results of the portfolio analysis, the knee surgery is located to the most favorable cell of the matrix characterized with strong hospital strength and high market attractiveness. Moreover, this service, as indicated by the size of its circle, is the second largest revenue-producing service in relation to the hip surgery and the arthroscopy. From all three services, the highest revenue generating service appears to be the hip surgery. The revenue associated with the hip surgery is estimated to be approximately double than the revenue of the knee surgery. However, compared to the knee surgery, the hip surgery is located in a weaker zone rated with medium market attractiveness and weak hospital strengths. The third service studied in the portfolio analysis - the arthroscopy, receives the lowest rankings. This service is located in the weakest cell of the multifactor matrix situated in the lowest-right corner of the matrix. Thus, the arthroscopy has low market attractiveness and weak hospital strengths. It is also estimated that the arthroscopy generates the lowest revenue to the hospital, which approximately is five times lower than the revenue associated with the hip surgery and two times lower than the revenue associated with the knee surgery.

The explanation of the portfolio results implies that the provision of the arthroscopy appears to be less beneficial for the AZM, while the provision of knee or hip surgery is more favorable for the hospital. It should be considered however that the portfolio analysis presented here, includes only three types of services from the broad service range provided by the AZM. Therefore, the conclusions should only be interpreted in relative terms. Thus, the arthroscopy is expected to be less beneficial compared to the knee and hip surgery, and vise verse - the knee and hip surgery are expected to be more attractive compared to the arthroscopy. In case more services are included in the analysis, the strength of these conclusions might well change, i.e the knee and hip surgery might be less attractive than other services provided by the AZM and the arthroscopy might appear more beneficial in comparison to other hospital activities. Nevertheless, the relative rank order between the three services is expected to remain constant.

5.1 Define future strategies for the AZM

Recently, the Ministry of Education, Culture and Science of the Netherlands, has adopted a policy of reducing the expenses for the public hospitals. This fact creates economic pressures on the management board of the AZM. Therefore, the current management priorities in the AZM include the definition of strategies in order to achieve more efficient and effective hospital performance. Parallel to the cost reduction issue, the management of the AZM is also confronted with a changing market place. The AZM activities are taking place in an environment with a continuously increasing competitiveness. This is because, the Dutch government, as well as other EU governments, approve and encourage the competition in the health care sector. As a results, most Dutch hospitals situated close to AZM and the nearby hospitals in the neighboring Belgium and Germany, have adopted marketing methods in order to capture bigger part of the market within which they are competing. In addition to this, the number of outpatient and inpatient medical centers that provide services similar to these of the AZM, is increasing. These medical centers are mostly private for-profit organizations operating with a high efficiency level in order to assure their economic survival. As a result, the financial performance of the AZM (even though a specialized not-for-profit organization) is threatened.

Given the circumstances under which the AZM operates, the multifactor matrix can be used by the hospital management in order to identify the weaknesses of the hospital and to face the external threats for a more competitive position. The strategies that are generated from the multifactor matrix with regards to knee surgery, hip surgery and arthroscopy for the evaluated services, are presented below:

- For the knee surgery, which is located in the most favorable cell of the matrix, the strategy that can be defined is the cost leadership. This strategy is designed to gain an advantage over competitors by producing this service at a lower cost than the competitors. The cost reduction should be based on the principle economy of scale regarding the provision of knee surgery. For example, an operation table could be used only for knee operations in a knee operation day. This will reduce the costs necessary for the preparation of the operation room in case a different type of operation is provided. Other cost reduction strategy includes efficient marketing and administration, application of cost-effective medical technology.

The hospital management might also consider an increase in the investments regarding this service in order to enable the expansion of the service provision and to achieve dominance at this market. As suggested by the portfolio results, the knee surgery offers the relatively most attractive investment opportunities. The AZM should also consider an increase in the research and capital expenditures on technology improvement regarding the knee surgery in order to assure adequate innovation level. Furthermore, the knee surgery appears to be relatively the most preferable candidate for a satellite facility, such as a rehabilitation equipment center within the AZM.

The AZM could also adopt non-traditional expansion plans with regards to the knee surgery. These plans include strategies of backward or forward vertical integration. According to the backward vertical integration, the AZM should grow along the channel of distribution of the equipment for the knee surgery, toward its suppliers. An example for a backward vertical integration involves an interaction of the major suppliers of knee surgery products, within the AZM's structure. Alternatively, the forward vertical integration suggests that the AZM should grow toward the patient care related to the knee surgery. Based on this, it might be beneficial for the AZM to invest for example in a knee surgery center, which would be supported by a policlinics (pre-operation care) and a rehabilitation (post-operation) center. Such vertical integration can reduce the costs and enhance the hospital's competitive position. Cost reductions may occur through lower supply costs and better integration of the elements of production. This investment would take into account the economy of scale related to the provision of the knee surgery and furthermore would generate higher profit for the AZM.

- Compared to knee surgery, the hip surgery is located in a weaker zone on the portfolio matrix characterized by weak hospital strengths and medium market attractiveness. Despite the location, it should be considered that this service generates the highest revenue for the AZM when compared to both knee surgery and arthroscopy. Therefore, the potential benefits for the AZM of providing hip surgery cannot be ignored. Given the financial attractiveness of the hip surgery and its weak position accordant to the portfolio matrix, the following implication for the AZM can be outlined.

First and foremost, the management of the AZM might consider the allocation of additional resources in order to enforce the hospital strengths and to promote the

shift of the service to a more favorable zone. This strategy is based also on the fact that the demographic pattern of the Limburg region where the AZM operates, is changing. The number of the old residents in this area is continuously increasing and the share of the young persons is declining. Based on this, an increased demand for hip surgery can be expected. Thus, the management of the AZM should try to forecast the possible increase in the demand for the hip surgery and to adjust adequately its capacity.

Another strategy that can be defined for the hip surgery is the differentiation. This strategy includes modification of the service with the intention that it differs or it is at least perceived as different by the consumers, compared to the services of the competitors. In this regard, the management of AZM should focus on marketing efforts. The service might be different by emphasizing the level of quality, the effectiveness of care, the ease access to services, the possible convenience and the physicians' reputation. The AZM as an academic hospital has certainly established a favorable reputation and image among the population in the region. The services provided are highly specialized and often luck good substitutes in the region. With regards to hip surgery, however, marketing efforts might be significant given the existence of (potential) competitors. These efforts can be focused on the differentiation of hip surgery based on the favorable image and the high quality that an academic hospital offers. Moreover, the AZM can further promote its image by projecting its affiliation with the faculty of medicine of the Maastricht University and by marketing the application of the latest (even though expensive) technology. These strategies may well help the AZM management to capture a bigger part of the market and to multiply the potential profit associated with the hip surgery.

- As illustrated in the multifactor matrix, the arthroscopy is located at the most weak cell and it is generating the lowest revenue compared to knee and hip surgery. Therefore, the management board of the AZM should cautiously consider any investments related to this service. If a choice should be made, allocation of resources to the knee and hip surgery would be more beneficial for the hospital than investments in the arthroscopy. The strategy that can be adopted with regards to the arthroscopy is a focus strategy. A focus strategy determines a well-defined "niche" in the total market for the given service where the marketing efforts of the hospital should be focused. In this regard, the AZM should define an effective and efficient arthroscopy procedure, and should focus the efforts regarding arthroscopy, on the provision of this

activity. For example, if the knee arthroscopy appears to be the most attractive arthroscopy application, then the hospital should try to focus the medical efforts to this activity. To determine this issue however, results from market research will be necessary.

5.2 The limitations of the study

- The AZM as a not-for-profit organization that is also closely related to research and education, has various specific characteristics. The hospital plays an important role in the experimental/fundamental clinical research as well as in education and training of medical students. As a result, the AZM is primarily focused on not-for-profit management objectives. However, the market and competition play increasingly important role in the environment where the AZM is competing. This requires from the AZM to reconsider the current management policy and to include new commercial terms. Due to these specific features, the application of the portfolio analysis to the AZM reported here, was based to the modification of existing portfolio analysis process to the special hospital features. During the application of the portfolio analysis to the AZM four major limitations were encountered: The first limitation of this study is related to the limited literature about the application of portfolio analysis in health care organizations. The portfolio research in hospital settings is particularly limited. Despite that fact, the literature reports numerous applications of the portfolio analysis to commercial activities, which have been enrich the literature review provided in this thesis. Yet, these studies do not account for the specificities of the health care sectors and provide limited base for conclusions.
- The weak cost information system in the AZM presents the second limitation. Because of this, the availability of the data was one of the primary criteria in order to define which services would be involved in the portfolio process. Only services with the readily available data were selected for the analysis and other relevant services where data were lacking, were excluded. This may imply that services important for the positioning of the AZM at the market place and relevant for the priorities of the management board, were not involved in the portfolio analysis. This most probably has affected the system ranking in absolute terms.
- Even though the availability of data was considered when selecting services and the evaluation criteria, the collection of data regarding the values of these criteria appeared difficult. Since the data were not readily accessible, it was necessary to

arranged appointments with the appropriate personnel - health professionals, managers and financial controllers, well in advance to fit in their busy schedule. Therefore, the data collection procedure took longer time period than expected. Furthermore, during the data collection process, some data required for the application of the portfolio analysis appeared to be unavailable in the AZM (e.g. the market share). This required collection of additional data outside the AZM. As a consequence, the phase on data analysis was further delayed and questions about the comparability of the data were raised. Given the importance of the values of the criteria for the ranking of the service, these weaknesses of the hospital information system represents perhaps the most important limitation of the study.

- The forth limitation concerns the construction and distribution of the questionnaire with regards to the weighting and rating procedures. The questionnaire should be as understandable and shorter as possible because it was distributed among individuals with different professional background (e.g. managers, medical doctors) and busy time-schedule. The attempt to make the questionnaire shorter may have reduced its clarity, especially for non-mangers and the little-time that respondents could spend on the questionnaire may have caused biases especially with regards to the answers of the last questions.

Attempts to overcome these limitations may improve the portfolio analysis and may increase the predictive validity of the conclusions. Furthermore, comparison with preliminary (theoretical) expectation and result of alternative analysis aimed to measure the same construct can establish the theoretical and convergent validity of the study. In addition to this, the replication of the portfolio analysis to the same group of services and with the AZM setting but by a different research group can help to establish the reliability of the analytical method, and particularly the probability of replicating the results reported here.

5.3 Recommendations for future research

The limitations of this study suggest a need for further research in several major areas:

- First, the portfolio analysis should be modified in accordance with the specificities of individual setting. Given the limited application of portfolio analysis to non-profit organizations such as the AZM, further research is necessary to establish criteria that suit the nature of an academic hospital that functions in a competing environment.
- Second, future research is necessary to determine the construction of an universal portfolio matrix that shows the ranking of the services in relative as well as in absolute terms. Such research should in particular focus on how to determine the cut-off points for the cells of the portfolio matrices in an objective manner independent of the service selection.
- Third, the validity and the reliability of the portfolio analysis should be tested in order to identify the relation between the portfolio design and the legitimacy of the portfolio results. Research focused on this issue, can help to establish credibility of the portfolio analysis for hospital managers and medical personnel.

5.4. The final words

Despite the conclusions provided by the portfolio analysis, the hospital organizations, especially those not concerned with profit and financed by the state, will remain primarily concerned with the social issues related to health care provision. Thus, although the portfolio results may imply the need for a hospital to terminate the provision of a given services, the hospital management might choose to continue to provide the service because it is necessary for the society and because it can save or improve the patient's life. Therefore, when a public health care organization is concerned, the results of the portfolio analysis cannot be considered as decision-making criteria in isolation. They should rather serve as an indication for future strategy, but it is up to the management finally to decide how far to consider their application. Other social criteria such as equity, social needs, and social welfare, might often swap the conclusions based on portfolio analysis.

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APPENDIX A

Timetable for applying the multifactor matrix in AZM

	Num	Activity	Necessary Information	Time period
Phase 1 : Operationalization of the Portfolio model	1.	Selection of services	1) What services bze4 offers? 2) What are the priorities of bze4 regarding the provision of services? 3) Is information available for all services?	2-23 December 3 weeks
	2.	Define criteria for evaluation	1) Growth rate 2) Profit 3) Size of the market 4) Reimbursement Policy 5) Capacity utilization 6) Efficiency 7) Availability of professional staff 8) Relative product quality	
	3.	Define data weighting	1) Who is responsible to weight the data? 2) How weighting can be done? 3) Which criteria to use for the weighting?	
	4.	Define data rating	1) Who is responsible to rate the data? 2) How rating can be done? 3) Which criteria to use for the rating of the services?	
	5.	Calculation of the total weights	1) How the total weights of Bze4 services can be calculated?	
Phase 2	6.	Preparation of data collection	1) Is the data available? 2) Where can I find the data? 3) How can I collect the data?	2 January-15 January 2 weeks
Phase 3	7.	Data collection	Appointments and discussions with the hospital managers and medical personnel.	15 January-15 February 4 weeks
Phase 4: Data analysis	8.	Locate services at the matrix	1) How can I plot the data to the grid? 2) How can I establish the cutoff points? 3) Where can I find the total revenue from each service? 4) How can I illustrate the revenues at the matrix?	15 February-15 March 4 weeks
	9.	Discussion and Conclusions	1) How to define future strategies to Bze4?	15-30 March 2 weeks
Phase 5	10.	Report	Preparation of the report	1-20 April

APPENDIX B

Calculation of profit and unit cost

Profitability is the ability of a company to provide investors with a particular rate of return on their investment. The profit of the provided services/products can be calculated if the total revenues and the total costs are already known. The revenues increase the owner's interest (equity) in the business while expenses decrease the owner's interest. Together these items define the fundamental meaning of profit, which can be simply defined simply as the excess of revenues over costs (profit= total revenue- total costs).

The term *total revenue* (TR) can be expressed as the total revenues from all services provided by the healthcare institutions. Total revenue is usually a function of the price of a specific service (adjusted for the discount) multiplied by the quantity of services provided at that price.

The term *cost* in accounting theory has a very precise definition. It is the value assigned to an asset on the balance sheet. It becomes an expense when it is used in the provision of services and appears in the income statement of investor-owned organizations. Cost information must be flexible. It is usually used by specific decision-making groups. Cost information is used for the preparation of budgetary cost variance reports for department managers, cost reports for third-party payers and forecasted project cost reports for planning agencies.

Two major categories of costs classified by trace ability are (Boles,1998): (1) direct costs and (2) indirect costs. A *direct cost* is specifically traceable to a given cost objective (product or service). For example, the salaries and supplies are often classified as direct costs of a department because they are directly related to the provision of services by that department. *Indirect costs* cannot be traced to a given cost objective without resorting to some arbitrary method of assignment. For example depreciation, employee benefits and costs of other departments would be classified as indirect costs.

Cost is also classified by the degree of variability in relation to output. Two major categories of costs that are classified according to their relationship to output can be identified (Boles,1998): (1) *variable costs* and (2) *fixed costs*. Variable costs change as output or volume changes in a constant, proportional manner. For example, if total costs associated with a certain procedure increase by 10 percent when the volume increases by 10 percent, these costs would be classified as variable costs. Patient care supplies are examples of pure variable costs since they increase in

proportion to number of patients served. Fixed costs are those costs that do not vary with the volume. They are a function of time, not of the output. A good example of a fixed cost would be professional staff or supportive personnel who are paid on a salary base.

The *unit cost* is a calculation of the cost of an individual unit provided or produced by a department or an organization. Cost and unit cost calculations are very important in management accounting for several reasons, particularly when setting selling prices, valuing stocks, or determining income. In the development of a flexible budget, the hospital administrator should use the concept of a *standard unit cost*. Basically, a standard unit cost represents what a procedure or service of a unit should cost. It is a detailed estimate of the amount of resources required to provide a specific procedure, test or service in accordance to quality standards and in an efficient manner. Standard unit cost provides a basis for measuring management performance by permitting a comparison between the actual costs per unit incurred and the standard costs per unit planned by the managers.

The actual *full costs per unit* mean the total cost of providing one unit of activity. The simplest way to determine the full cost per unit (UC) is to apply the basic averaging technique (Blommaert,1995): total costs (TC) divided by level of activity (Q) or UC=TC/Q (Q= level of output). Another way to take the full cost per unit is to sum the *total direct cost per unit* (TDCu) and *the total indirect cost per unit* (TICu). The direct costs per unit are costs that can be directly related to the production of one good or the delivery of one service. They can be easily determined from purchase invoices. There are often direct costs, such as material costs, costs of labour, import duties, transport costs, or insurance costs. The direct costs can easily be allocated to individual products/services. Indirect costs per unit are however, more difficult to analyze. The calculation is often time-consuming and depends on the management needs.

The three basic groups of methods for the allocation of indirect cost to a unit are presented below (Boles,1998):

1) *Methods related to output*. The most common representative of this group is the method based on the quantity of output. The easiest way to assign indirect costs to outputs is by dividing the indirect costs by the quantity of outputs or services produced. However, assigning equal amounts of indirect costs to each output is, not

always accurate. The only situation when the averaging method can be adequate is the case of homogeneous outputs with respect to their resource requirements.

Example: What is the unit cost of homogeneous hospital products if the production volume is 50.000 units and the indirect costs are 800.000 Euro and the direct costs are 5 Euro per product. Solution: With a production volume of 50.000 units the direct costs per unit are 800.000/50.000=16 Euro. The total costs per unit are the total direct and indirect costs per unit: 5+16= 21 Euro per unit.

2) *Methods related to inputs.* This group of allocation methods is often represented by the surcharge method. The surcharge method is more adequate for the calculation of the unit cost than the output based method if the output is heterogeneous. The essence of the surcharge method is that the total indirect costs are expressed as a percentage of the direct costs, the labour requirements or the materials, used in that period. The indirect costs can be incorporated into the unit cost by the means of a single surcharge percentage (singular surcharge method). In order to determine the unit cost more accurately, several surcharge percentages can be used (plural surcharge method).

Example: Total directs cost of drugs for coming year=1.100.000 Euro

Total indirect cost of pharmacy=2.200.000 Euro

If it is known that the direct costs are a suitable base for the allocation of the indirect costs the surcharge percentage can be calculated as following: Surcharge percentage = 2.200.000/1.100.000=200 percent

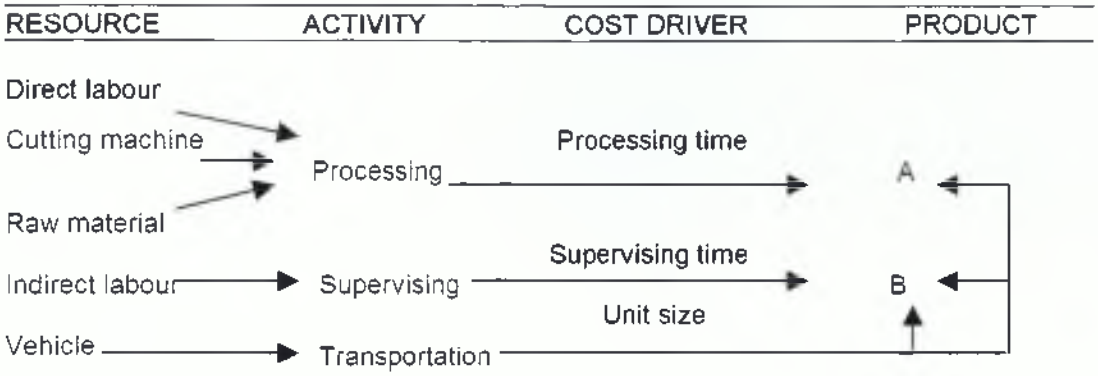
So whatever the direct drug's costs are, they should be tripled (direct cost per unit + 200% of the direct costs per unit) in order to calculate the full unit costs.

3) *Process related methods (Sundem, 1987).* The two most common representatives of these allocation methods are the Activity Based Costing (ABC) method and the Cost Center method.

In the ABC method, the indirect costs are allocated to activities because these activities, rather than the volume of product being processed, are viewed as the drivers behind the cost. Cost drivers affect cost behavior in hospitals. Each cost driver may influence costs by itself as well as in combination with other cost drivers. Cost drivers may include any of the following factors: case mix, patient utilization preferences, population demographics, socioeconomic characteristics, patient volume, input prices, input efficiency, resource utilization patterns, fixed costs and other

descriptors of physician and medical practice patterns. An example of the ABC is presented below (Andrade,1999):

ABC model



The second representative of the process related allocation methods is the *Cost Center method*. A cost center collects all costs, which are incurred in performing a certain function. A department is a recognizable organization unit, whereas a cost center is a unit created for unit cost calculation and cost control. The essence of the cost center method is that direct costs are accounted directly to the cost objectives (the cost center), while indirect costs are allocated in two steps. For defining the indirect costs, the managers must establish which department has incurred the costs. If it is an auxiliary department, it costs must in turn to be allocated to the department for which it provides services and so on until all indirect costs have been accounted to main cost centers. Because of the direct contact that these departments have with the cost objectives, the indirect costs can finally be allocated to products.

Concluding, the process related methods are the most suitable methods to apply for cost allocation in hospital units. These methods can give possibility to calculate cost per unit because of their precise cost allocation mechanisms. Based on the process related methods the indirect costs are allocated to the units where they really generated. The hospital administrators can use the process related method to calculate profits of each unit in a precise manner and to estimate the exact total profit of their hospitals. Therefore, the process related methods are considered to be more advantageous than the output and the input related methods. If the two representative methods of the process related methods are compared the ABC method, appears to be more preferable when setting prices and when calculating profits of a hospital unit. The ABC method however needs very well developed hospital information. The

absence of such system should first be overcome before a hospital starts to apply the ABC method as an allocation mechanism.

APPENDIX C

Questionnaires

Appendix C.1

Questionnaire regarding the required data to evaluate the values of the criteria

Criterion	Data	Knee surgery	Hip surgery	Arthroscopy
Growth Rate				
	1. Annual visits in 2001			
	Annual visits in 2002			
	Annual visits in 2003			
	or			
	2. Annual patient days in 2001			
	Annual patient days in 2002			
	Annual patient days in 2003			
	or			
	3. Annual admissions in 2001			
	Annual admissions in 2002			
	Annual admissions in 2003			
Profit				
	1. Amount per unit paid by the insurer			
	Amount per unit paid by the patient			
	Amount per unit paid by other parties			
	2. Total indirect cost per unit			
	Total direct cost per unit			
	Cost of labor per unit			
	Cost of materials per unit			
	Other direct costs			
	or			
	Total variable cost per unit			
Size of market				
	1. Annual patients in 2003 in the region			
	2. Annual patients in 2003 in the AZM			
Reimbursement policy				
	1. Amount per unit paid by the insurer			
	Amount per unit paid by the patient			
	Amount per unit paid by other parties			

| Criterion | Data | Knee surgery | Hip surgery | Arthroscopy |

Capacity Utilization

1. Average units delivered per day
   Maximum units delivered per day

or

Average operation hours per day
Maximum operation hours per day

or

Average labor hours per day
Maximum labor hours per day

Efficiency

1. Average operation hours per unit
   Standard operation hours per unit
   Standard unit cost of using an oper. room

or/and

Average labor hours per unit
Standard labor hours per unit
Standard unit cost of labor

or/and

Average machine hours per unit
Standard machine hours per unit
Standard unit cost of using a machine

Availability of professional staff

1.

Number of physicians trained providing
this service

or

Number of nurses trained providing this service

or

Number of technicians trained providing this service

Criterion	Data	Knee surgery	Hip surgery	Arthroscopy
Relative product quality				
1.	Annual delivered treatments in 2003			
2.	Annual successful delivered treatments in 2003			

Appendix C.2 The questionnaire used for the weighting and rating procedures

Subject: Research invitation: Portfolio Analysis

Dear Mr./ Mrs.

My name is Apostolis Tsiachristas; I am a health care management student and currently writing my final thesis about portfolio analysis and its application to AZM. The research is supported by the Department of Health Care Organization, Policy and Economics of University Maastricht as well as the management of BZE4 unit of Academic Hospital Maastricht.

Portfolio Analysis is a strategic management tool, which offers to hospital administrators a customized approach to classify their current services into categories based on their market attractiveness and hospital strengths. The aim of this research is to apply a portfolio analysis model and to define future management strategies for the Academic Hospital Maastricht.

In order to collect data regarding the importance of the criteria and services that are involved in the portfolio process, I designed a questionnaire. I would like to ask you 10 to 15 minutes of your time to fill out the questionnaire. The questionnaire consists of nine entries, categorized into three broad categories.

The participation will be completely confidential and highly important for the project.
To fill in the questionnaire follow the link below:

`http://www.beoz.unimaas.nl/Enquete/AZM/questionnaire.asp`

For further questions please send mail to: a.tsiachristas@beoz.unimaas.nl

Thank you kindly for your cooperation!

Apostolis Tsiachristas

Questionnaire

The aim of this questionnaire is to collect data for the development of portfolio analysis with regards to orthopedic services provided by AZM. The model for portfolio analysis will be applied to define future management strategies.

This survey is a part of a university project and has pure academic goals.

The information we ask for cannot be associated with your personality.

The participation will be completely confidential and will be highly important for the project.

Part 1.

The first questions concern the strategic evaluation of orthopedic services with regards to market attractiveness and hospital strengths. Please note that we are interested in your personal opinion.

Q1. The following is a list of four characteristics of a hospital service that indicate the potential market attractiveness of providing that service. According to you, what is the level of importance of these hospital characteristics for the overall performance of AZM?

Please, distribute 100 points among the four characteristics in order to reflect the relative importance that you assign to them.

Growth rate
(the annual percentage change in the volume of a service provided) _____

Profit
(the excess of revenues over costs with regards to a service unit) _____

Size of the market
(the average number of patients per year who need a given hospital service) _____

Reimbursement policy
(the extend of insurance coverage of a given hospital service) _____

Q2. Bellow, there are another five characteristics of a hospital service that can be used to analyze the hospital strengths in providing that service. According to you, what is the level of importance of these hospital characteristics for the overall performance of AZM?

Please, distribute 100 points among the four characteristics in order to reflect the relative importance that you assign to them.

Capacity utilization
(the degree to which equipment, space or labour is used when providing a service) _____

Efficiency
(the inputs necessary to deliver a service compared to a standard input quantity). _____

Availability of professional staff
(the availability of physicians, nurses or technicians trained to provide a service) _____

Relative product quality
(the overall quality of a services compared to other hospital services) _____

Part 2.

The following questions concern your evaluation of three orthopedic services for the overall performance of AZM. Please remember that we are interested in your personal opinion.

Q3. According to you, what is the level of importance of knee surgery for AZM?

(-3) ☐	(-2) ☐	(-1) ☐	(0) ☐	(1) ☐	(2) ☐	(3) ☐
extremely low importance	very low importance	low importance	moderate importance	high importance	very high importance	extremely high importance

Please explain why:

_____

Q4. In your opinion, what is the level of importance of hip surgery for AZM?

(-3) ☐	(-2) ☐	(-1) ☐	(0) ☐	(1) ☐	(2) ☐	(3) ☐
extremely low importance	very low importance	low importance	moderate importance	high importance	very high importance	extremely high importance

Please explain why:

_____

Q5. In your opinion, what is the level of importance of arthroscopy for AZM?

(-3) ☐	(-2) ☐	(-1) ☐	(0) ☐	(1) ☐	(2) ☐	(3) ☐
extremely low importance	very low importance	low importance	moderate importance	high importance	very high importance	extremely high importance

Please explain why:

_____

Part 3.

At the end, there are some questions concerning your socio-demographic status. The information we require would not be related to your identity. The data is necessary in order to analyze the results of the survey.

Q6. What is your age? _____ years

Q7. What is your gender? ☐ male ☐ female

Q8. Which of the following categories best describes your current position in AZM?

☐ orthopedist ☐ physician ☐ nurse ☐ manager ☐ financial controller

Q9. How many years are you working on your current position? _____ years

This is the end of the questionnaire.
Thank you very much for your participation

APPENDIX D

Excel spreadsheets used for the data analysis

Collecting data gained by questionnaires

At this step the table bellow is filled with the data that is available by the questionnaires
The collection is made for each questionnaire seperately
The questionnaire consists of 9 questions. The first 2 questions consist of 4 entries each. As a result there are 15 entries totally
The plot of data at this table is giving automatically the results at the following tables
the criteria weighting and activities rating

The size of this table can change, depending on the number of questionnaires or the number of questions.

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15
QUESTIONNAIRE 1	50	30	15	5	70	10	10	[illegible]	[illegible]	[illegible]	[illegible]	44	M	FC	8
QUESTIONNAIRE 2	20	30	35	15	40	15	15	30	[illegible]	[illegible]	[illegible]	36	M	FC	3
QUESTIONNAIRE 3	40	30	15	15	40	30	30	30	4	4	3	33	F	FC	[illegible]
QUESTIONNAIRE 4	40	20	35	15	20	20	50	90	4	4	2	36	M	FC	4
QUESTIONNAIRE 5	25	25	25	25	15	20	15	60	3	3	3	47	M	MG	3
QUESTIONNAIRE 6	30	10	10	50	20	30	30	20	4	4	4	54	M	MG	21
QUESTIONNAIRE 7	25	20	30	25	20	20	40	20	4	4	1	40	F	MG	1
QUESTIONNAIRE 8	25	50	25	0	0	50	0	50	3	3	3	36	M	MG	5
QUESTIONNAIRE 9	10	30	40	20	20	30	30	20	4	5	3	40	F	MG	8
QUESTIONNAIRE 10	28	28	22	22	24	28,5	19	28,5	[illegible]	[illegible]	[illegible]	40	M	FC	15
QUESTIONNAIRE 11	8	8	8	75	24,5	24,5	24,5	26,5	0	0	2	45	M	MG	1
QUESTIONNAIRE 12	10	20	40	30	[illegible]	[illegible]	[illegible]	[illegible]	1	1	1	34	F	NS	2
QUESTIONNAIRE 13	23	31	23	23	24	27	26	24	-1	-1	1	40	M	FC	6
QUESTIONNAIRE 14	24	24	26	24	22	26	[illegible]	[illegible]	[illegible]	1	[illegible]	44	M	MG	2
QUESTIONNAIRE 15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
QUESTIONNAIRE 25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mean	25,571	25,429	25,071	24,643	26,115	25,462	22,654	26,077	2,615	2,692	2,231	40,643			6,79
Std. Dev.	12,005	10,218	10,418	19,838	16,571	9,838	10,670	[illegible]	1,758	1,843	1,166	5,746			5,75
Median	26,000	26,500	25,000	22,500	22,000	26,000	25,000	26,500	3,000	3,000	3,000	40,000			3,50
Missing	0 (N)					1 (N)			1 (N)	1 (N)	1 (N)	0 (N)			0(N)

CRITERIA WEIGHTING

At the following table is analyzed the collected data which defines the score of the importance of each criterion.

In this case, the two first questions (9 entries) are defining the weight of each criterion.

The average of the answers/scores for each of these questions is giving the weighting score for every of the selected criteria

For example the average of the answers at Entry 1 (E1) of all questionnaires is defining the weighting score of growth rate etc

Criteria	Weighting score
Growth rate	26,571
Profit	25,429
Size of market	25,071
Reimbursement policy	24,643
Capacity utilization	26,115
Efficiency	25,462
Availability of professional staff	22,654
Relative product quality	28,077

ACTIVITIES RATING

At the following table is analyzed the collected data which defines the score of the importance of each activity of orthopedic service

In this case, three of the questions (Q3-Q5) at the questionnaire, are defining the rate of each service

The average of all answers/scores for each of these questions is giving the rating score for every of the existed service.

For example the average of question's 3 (entry 9) answers of all questionnaires is defining the rating score of "total knee" etc.

Activities	Rating score
Total knee	2,615
Total hip	2,692
Arthroscopy	2,231

TOTAL WEIGHTS

The total weights can be calculated, when the average weighting score of each criterion is multiplied with the average rating score of each activity.

With more details,every cell of the average scores at the criteria weighting board is multiplied with every cell of the average rating scores at the activities rating board.

	Total knee	Total hip	Arthroscopy
Growth rate	66,879	68,846	57,044
Profit	66,505	68,462	56,725
Size of the market	65,571	67,500	55,929
Reimbursement policy	64,451	66,346	54,973
Capacity utilization	68,302	70,311	58,257
Efficiency	65,592	68,550	56,799
Availability of professional staff	59,249	60,991	50,536
Ralative product quality	73,432	75,592	62,633

Required data to apply the multifactor matrix in AZM

Criterion	Data	Knee surgery	Hip surgery	Arthroscopy
Growth Rate				
1.	Annual visits in 2001			
	Annual visits in 2002			
	Annual visits in 2003			
or				
2.	Annual patient days in 2001			
	Annual patient days in 2002			
	Annual patient days in 2003			
or				
3.	Annual admissions in 2001	178	365	548
	Annual admissions in 2002	161	337	552
	Annual admissions in 2003	146	349	550
Profit				
1.	Price per unit	9.090,00	7.570,00	1.000,00
	Amount per unit paid by the insurer	9.090,00	7.570,00	1.000,00
	Amount per unit paid by the patient			
	Amount per unit paid by other parties			
2.	Total indirect cost per unit			
	Total direct cost per unit	0,00	0,00	0,00
	Cost of labor per unit			
	Cost of materials per unit			
	Other direct costs			
or				
	Total variable/direct cost per unit	7.409,00	6.827,00	722,98
Size of market				
1.	Annual patients in 2003 in the region	1.230	1.462	2.822
and				
2.	Annual patients in 2003 in the hospital	146	349	550
Reimbursement policy				
1.	Amount per unit paid by the insurer	9.090,00	7.570,00	1.000,00
	Amount per unit paid by the patient			
	Amount per unit paid by other parties			
Capacity Utilization				
1	Average units delivered per day			
	Maximum units delivered per day			
or				
	Average operation hours per day	7,20	7,20	3,06
	Maximum operation hours per day	8,00	8,00	8,00
or				
	Average labor hours per day			
	Maximum labor hours per day			
Efficiency				
1.	Average operation hours per unit	2,70	2,40	0,45
	Standard operation hours per unit	3,00	2,50	1,00
	Standard unit cost of using an oper room	1.058,00	1.058,00	301,00
or/and				
	Average labor hours per unit			
	Standard labor hours per unit			
	Standard unit cost of labor			
or/and				
	Average machine hours per unit			
	Standard machine hours per unit			
	Standard unit cost of using a machine			
Availability of professional staff				
1.	Number of physicians trained providing this service	5	5	3
or				
	Number of nurses trained providing this service			
or				
	Number of technicians trained providing this service			
Relative product quality				
1	Annual delivered treatments in 2003	146	349	550
2.	Annual successful delivered treatments in 2003	144	338	547

CRITERIA RESULTS

Every criterion is evaluated by the existin data of the organization or from the environment that is operate in

Each criterion has to be evaluated for each activity of orthopedic service
For example, the growth rate of each activity of orthopedic service is evaluated by the aspects for this criterion that already exist.

The results of the evaluations are presented bellow

			Total knee	Total Hip	Arthroscopy
Growth rate	Alternatives		90,76%	99,25%	100,18%
	visits	1	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!
	patient days	2	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!
	admissions	3	90,76%	99,25%	100,18%
Profit			1.681,00	1.043,00	277,02
	cont. margin	1	1.681,00	1.043,00	277,02
	net income	2	9.090,00	7.570,00	1.000,00
Size of market			11,87%	23,87%	19,49%
Reimbursement policy			100%	100%	100%
Capacity Utilization			90,00%	99,00%	61,20%
	units	1	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!
	operation hours	2	90,00%	90,00%	61,20%
	labor hours	3	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!	#ΔΙΑΙΡ/0!
Efficiency			317,40	105,80	165,55
	operation hours	1	317,40	105,80	165,55
	labor hours	2	0,00	0,00	0,00
	machine hours	3	0,00	0,00	0,00
Availability of professional staff			5,00	5,00	3,00
Relative product quality			98,53%	98,85%	99,45%

TOTAL SCORES

The total scores are calculated, multipling the total weights with the criteria results of each activity.

Furthermore, every cell of the total weihgts board is multiplied with every cell of the criteria results board.

The sum of the total scores of market attractiveness criteria of each activity is defining the market attractiveness of this activity.

The sum of the total scores of hospital strengths criteria of each activity is defining the hospital strength of this activity.

The sizes of the circles representing each service at the multifactor matrix is proportional to the revenue generated by that service

The revenues of each service are presented below of the next table

	Knee sergery	Hip sergery	Arthroscopy
Growth rate	60,700	68,327	57,149
Profit	111.795,736	71.405,365	15.714,036
Size of the market	7,783	16,113	10,900
Reimbursement policy	64,451	66,346	54,973
Market attractiveness	111.928,670	71.556,170	15.771,184
Capacity utilization	61,472	63,280	35,654
Efficiency	21.136,211	7.252,621	9.403,044
Availability of professional staff	296,243	304,956	151,607
Relative product quality	72,426	73,209	62,292
Hospital strength	21.566,351	7.694,066	9 652,596
Total revenue in 2003:	€ 1.327.140	€ 2.641.930	€ 550.000