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## Developing customer relationship management (CRM) processes using standard frameworks and MCDM techniques

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### Abstract

Organizations have found that functional approach to business destroys flexibility and agility by gaining experience over the time. The main weakness with Task-based organizations is that they can hardly act flexibly and adapt themselves to the changing environment. In today's dynamic and competitive business world, organizations focus significantly on managing and improving their business processes. Therefore, nowadays to be survived and successful, certainly the process approach must be followed. In addition, organizations having such improvement and innovations are looking to create organizational wealth. In this regard, the present study is trying to identify and describe processes from reputable reference models in Customer Relationship Management (CRM) and more importantly to design and streamline CRM processes effectively for organizations in order to improve processes and offer value to customers. In this paper, first by identifying and explaining CRM reference models, three models were selected based on five criteria (flexibility, Understandability, comprehensiveness, Completeness and Usability) using Analytic Hierarchy Process (AHP) technique which are relatively as follow: SAP, CCOR & PCF. Then, the processes of the three models were extracted and gathered in a comprehensive list to offer a united framework to design CRM processes. Finally, a case study will show the applicability of the proposed model. With this paper, we enrich research by a valuable process framework for developing well-designed reference models.

**Keywords:** CRM Reference Models; Process design; AHP; QFD.

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### 1. Introduction

Nowadays, business process management has been widely adapted to improve the efficiency, reduce the cost and raise the quality. Along with time, plenty of business process models have been accumulated and become important intellectual assets which represent the business handling procedures of the organizations (Gao et al, 2017). In fact, process modeling is an indispensable task in the discipline of Business Process Management (Avila, 2018). In another words, globalization, customer orientation of companies, knowledge management and also the rapid changes and development and modern information systems have provided much complexity and functionality (Calpic and Bernus, 2002).

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Many scholars hold the view that previous models usually are blueprints of recommended practice and, thus, are sources of reusable and efficient business processes on organizations which can model their own business. Their main purpose is to streamline the design of enterprise models and enable organizations to apply 'Best Practice' knowledge. Whereas, they do not fully explain how to identify and design organizational processes and difficulties arise when an attempt is made to implement a CRM project in a company using reference models.

Since a low quality reference models can be damaging for the organization, a considerable number of works focus on guiding the development process to achieve a better RM quality (Oufkir et al, 2017; Andreas and Frank, 2016; Matook and Indulska, 2009; Thomas, 2006). Whereas, modelers do not have the teaching or the experience necessities to create process models of high quality (Avila, 2018).

In general terms, this means a necessity to identify reference models to develop process modeling.

The present research focuses on designing a conceptual framework of processes based on CRM reference models using AHP and QFD techniques.

In this paper, we established two research questions:

**RQ1** What are general and CRM reference models in the literature to develop a valuable process framework?

**RQ2** How can organizations choose their business processes from reference model using a systematic procedure and based on their strategic objectives?

To solve RQ1, a review of the literature about reference models and process modeling is necessary and for RQ2, our case study is performed based on our proposed process framework.

Moreover, this paper has two main objectives:

**Objective 1:** Identify and describe CRM reference models in order to develop a comprehensive process framework.

**Objective 2:** Providing CRM processes to organizations based on their strategic objectives.

None of the previous objectives has been explored in detail in the past, making this research a significant contribution to understanding the overall context of the area and promoting the process reference models.

This research can best be treated under six sections. At first, it gives a brief overview of the recent history. Then in the second section, some factors to assess model quality are distinguished and six reference models are selected. Following this, in section 3 the models are prioritized by AHP technique and the processes of the first three top-rated models are extracted and gathered in a united framework. To perform the proposed framework in a case study, the CRM objectives are studied (Section 4). Once they are identified, the strategic objectives of a manufacturing company named "Pand Caspian Company" are determined and in section 5 are prioritized by AHP technique. Here, according to the rated objectives of the company, its processes from the proposed framework are prioritized using QFD technique. Ultimately, section 6 covers discussion.

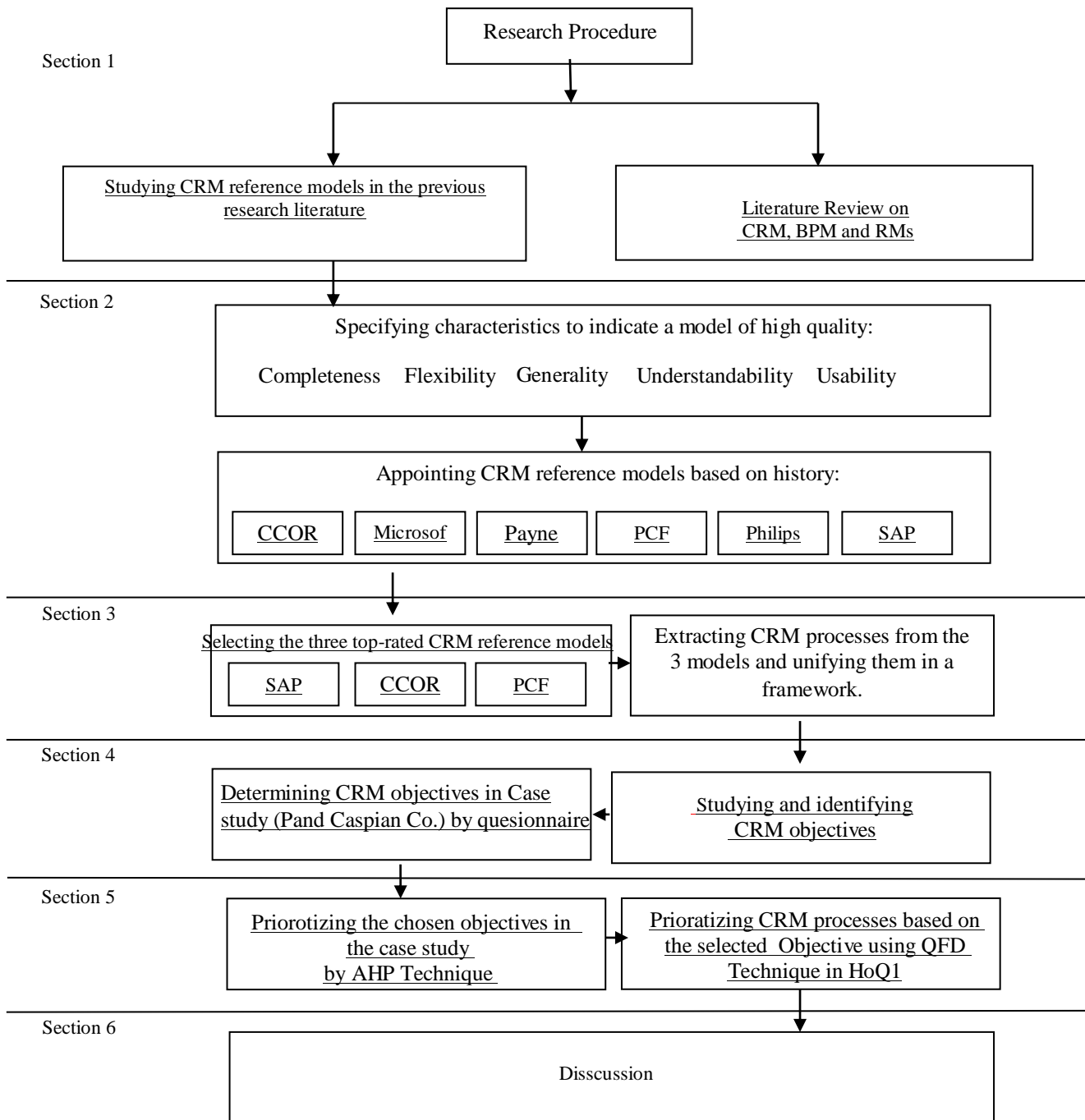


Figure 1. Research Procedure

## **2. Literature Review**

### **2.1. Reference Models**

In 2018, Avila published a dissertation in which he investigated in detail process modeling guidelines by studying 520 articles and how effective modelers are in using them. He performed this in order to create comprehensible process models and their practicability. He revealed that there is a lack of empirical studies in the literature that analyze process modeling guidelines as a group, which is how they are most frequently used in practice (Avila, 2018).

In 2017, Oufkir and co-workers designed a KM reference model fitting any kind of KM projects in view of producing a high quality model. They reported that this model is built on existing KM models literature and enhanced with theoretical findings. In particular, it is composed of three interrelated sub-models: KM processes, socio-technical influencing KM factors and KM key performance indicators.

Garbutt and his co-workers demonstrated the integrative relationship between Business Process Management and Enterprise Resource Planning Systems. Business process orientation takes cognizance of interdependencies and cross functional information sharing. ERP in turn incorporates software modules with the purpose of integrating business processes and functions. ERP is seen as an enabler of business processes which are automated through the ERP software, but BPM is not dependent on the technology. When considering enterprise systems it is necessary to take into account business process management together with enterprise resource planning (Garbutt et al, 2016).

Dijkman et al. provided an overview and comparison of the prevailing approaches to design such a business process architecture both with the usability and actual use of the indentified approaches. The five approaches are as following: goal-based, action-based, object-based, function-based and reference model based (Dijkman et al, 2011).

Jede and his colleagues provided a new conceptual process model for reference model development. They used a scientific approach consisting of four steps by developing a requirements framework for designing reference models, using this framework as a basis for the comparison of well-documented reference models, consolidating the gained insights from step one and two into a conceptual process model and Finally their case study (Jede et al, 2016).

In a wide-ranging of analysis of Spiegel and Caulliraux (2012), they define reference models comprehensively and explain how to combine them suitably.

Most published surveys on reference model literature are in German. Matook and Indulska mention that there has been little discussion about developing and assessing reference models (Matook et al, 2009). Therefore, they suggest a tool to manage and assess the quality of reference models.

Tomas highlights the need to define reference models and provided a new definition from different aspects. He points out that a reference model is an integrated model which is modified gradually by obtaining practical experiences of organizations (Tomas, 2005).

Fettke and his colleagues also analysed 30 process reference models comprehensively based on a framework consisting of criteria such as application domain, used process modeling languages, model's size, known evaluations and applications of process reference models (Fettek et al, 2005).

### **2.2. Customer Relationship Management**

Historically, four generations have been identified for customer relationship management (CRM): Operational CRM, Customer oriented CRM, Strategic CRM and flexible and agile CRM with Strategic approach.

The Customer relationship management definition follows from relationship marketing and is produced as the values and strategies of relationship marketing with specific prominence on customer relationships turned into a concrete application (Abu Amuna et al, 2017).

In the literature, the term “CRM” tends to be used to refer to business strategy that aims to understand, anticipate and manage the needs of an organization’s current and potential customers. It requires a customer-centric business philosophy and culture to support effective customer service and process. They studied the adoption of CRM strategies and its system in Small and medium-sized enterprises thoroughly (Njoroge, E. W. and Ombui, K., 2016).

Literature suggests that economic and social benefits arise from extended relationships with customers, and often recognizes that customer relationships are vital to the long-term success of the firm (Harrison, 2016).

According to Gartner (2011), CRM is a widely-implemented business strategy that focuses on customer segmentation to organize the customer-centric enterprises, and thus satisfy the customer needs and increase the revenues and profits. Therefore, this shows a need to be explicit about exactly what is meant by the word ‘CRM’.

In broad terms, CRM can be defined as any stimulus that is a concept which focuses on customer needs and demands that re-design the enterprise and its information technology-driven business process, CRM combines a series of methods, software and Internet access capability with customer-oriented business strategy and aims to get the profits and achieve high customer satisfaction (Burghard and Galimi 2011).

The term ‘conceptual CRM framework’ can be traced back to Payne and Frow. In their pioneering examination, they provide and discuss various kinds of CRM and also CRM processes thoroughly (Payne and Frow, 2013).

### **3. Conceptual background**

#### **3.1. Definitions**

##### **3.1.1. Customer Relationship Management (CRM)**

In section 1, a brief overview of the related definitions, CRM and reference models are provided.

CRM strategy attaches three fundamental dimensions of organizations, philosophy, technology and the strategy. Furthermore, the success of Customer CRM strategy contingent on the correct stability between three significant organizational resources: processes, technology, and people. (Abu Auna et al, 2017)

CRM is a widely implemented model for managing a company’s interactions with customers, clients, and sales prospects. It involves using technology to organize, automate, and synchronize business processes- principally sales activities, but also those for marketing, customer service, and technical support.

CRM systems are designed to compile information on customers across different channels -- or points of contact between the customer and the company - which could include the company's website, telephone, live chat, direct mail, marketing materials and social media (Yadav, 2016).

Customer Relationship Management (CRM) can broadly be defined a customer-centric business strategy that encompasses all business models, processes, methodologies, and techniques for closing the gap between an organization’s current and potential performance in acquisition, growth, and retention of valuable customers for mutual benefit (Kale, 2015).

The term ‘CRM’ was first used in 1990 and the general aspect of model re-use dates back to the 1930s but was revitalized in the early 90s by Scheer, sterle et al. and Hammel for the process modeling domain (Matook and Indulska, 2009).

### **3.1.2. Process**

A business process is the work an organization performs to manufacture its products and offer its services. Regardless of its type, be it governmental, enterprise or non-profit, the management of a business process is fundamental to assure the quality and efficiency of the work being done, ensuring the competence of an organization (Avila, 2018). The term 'Process' refers to the coordination of activities in line with achieving goal. CRM processes in fact are those which customer orientation is at its center. A better process is thus one that better contributes to meeting the strategic objectives of an organization. (La Rosa et al, 2017) According to Mendoza et al. (2007), the main business processes that should be addressed in CRM implementation are: marketing, sales, and services.

### **3.1.3. Reference Models**

Reference Models usually are blueprints of recommended practice and, thus, are sources of reusable and efficient business processes on organizations which can model their own business. Their main purpose is to streamline the design of enterprise models and enable organizations to apply 'Best Practice' knowledge.

Models are widely used in order to business process reengineering, packaged software customization, activity based costing, ISO certification and software selection. Therefore, the demand for a high model quality is evident (Schuette and Rotthowe, 2017).

According to one of the publications of American Productivity and Quality Center (APQC) in 2011, developing and assessing processes consumes a large portion of an organization's time. A process framework or reference model accelerates this process and increases the speed and depth at which an organization can study internal and external practices and processes. A process framework accelerates benchmarking activities by reducing the effort required to define a common language that Fettke, Loos and Zwicker published a survey that covers 30 of these.

While a variety of definitions of the term 'reference model' have been suggested, this paper will use the definition first suggested by Tomas (2005) who saw it as "Best Practice" for offering re-usable solutions. Actually, it is an abstract framework providing clearly defined solutions in a specific domain, integrating Business process re-engineering (BPR) concepts, Benchmarking and measuring processes in a specific framework. Three kinds have been introduced: General Organizational reference models, reference models for specific industries and domain-specific reference models.

## **3.2. Selecting six Reference Models**

In section 2, six models will be employed from literature based on three criteria as follow: access to models by the present researcher, updated models and practicality. Therefore, CCOR, Microsoft CRM, Payne, PCF, Philips and SAP are selected.

Furthermore, it should be mentioned that the four main vendors of CRM systems are Salesforce.com, Microsoft, SAP and Oracle. Other providers are popular among small-to mid-market businesses, but these four tend to be the choice of large corporations (Yadav, 2016).

**CCOR Model** – The Customer-Chain Operations Reference-model (CCOR) is the product of the Supply-Chain Council (SCC), an independent, non-for-profit global corporation. This model can be divided into 5 main areas: Assist, plan, Relate, Sell and Contract.

Table 1 presents the framework.

**Table 1. The framework of CCOR Model**

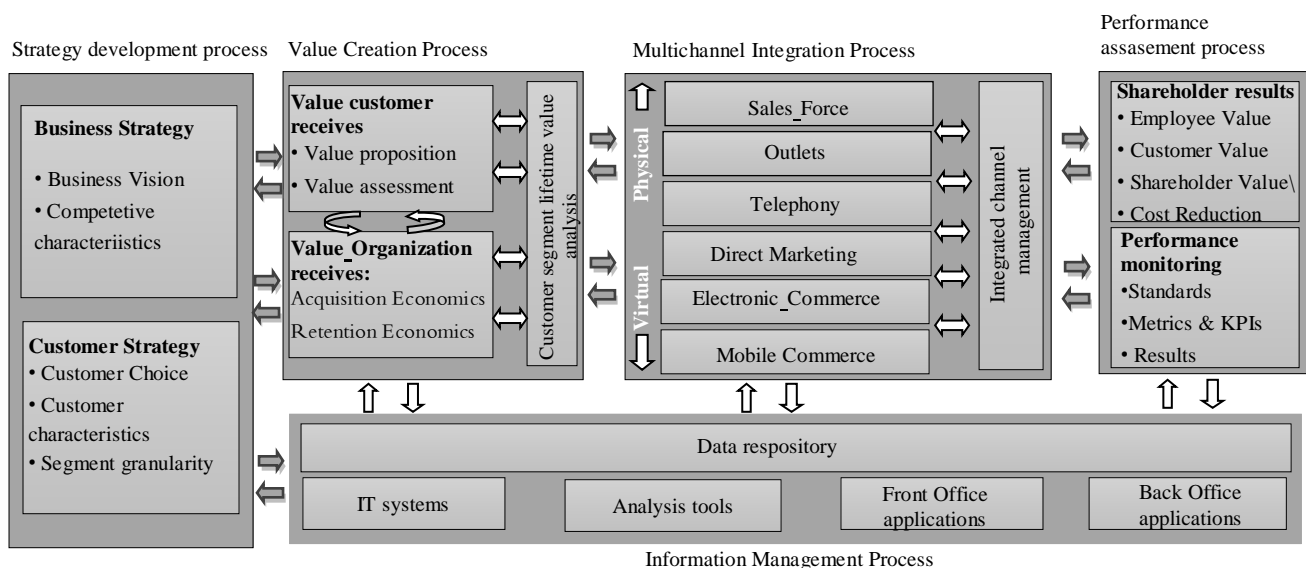
Assist	Self-Assist, Assist Remote, Assist On-Site, Enable Assist
Plan	Enable Plan, Plan Assist, Plan Contract, Plan Customer Chain, Plan Relate, Plan Sell
Relate	Enable Relate, Relate to Intermediary, Relate to Grouped Account, Relate to Named Account
Sell	Enable Sell, Sell to Intermediary, Sell to Grouped Account, Sell to Named Account
Contract	Enable Contract, Contract to Intermediary, Contract to Grouped Account, Contract to Named Account,

**Microsoft CRM Model** – Microsoft is one of the software leaders in offering services and solutions to people and businesses. Its model can be classified into 4 main areas in CRM: Sales, Service, Marketing and Enterprise Resource Planning (ERP). Table 2 shows the three main areas of the model.

**Table 2. The framework of Microsoft CRM Model**

Sales	Leads, Opportunities, communication, Data Base, Process
Marketing	Planning, Budgeting, Marketing List, Campaign Management, following
Service	Cases, Calls, Resource Management, Scheduling, Knowledge Base

**Payne Model** – Payne and Frow (2005) identified a strategic framework for CRM and introduced 5 key cross-functional processes: Strategy development process, Value creation process, Multichannel integration process, Information Management process and performance assessment process. Figure 1 provides Payne model in detail.



**Figure 2. The processes in Payne Model in detail**

**PCF model-** APQC’s Process Classification Framework (PCF) is taxonomy of cross-functional business processes was developed for the purpose of allowing the comparison of organizational performance within and among organizations. The Process Classification Framework was developed by APQC. The PCF organizes operating and management processes into 12 enterprise-level categories, including process groups and more than 1,000 processes and associated activities. Figure 2 provides a whole view of this model.

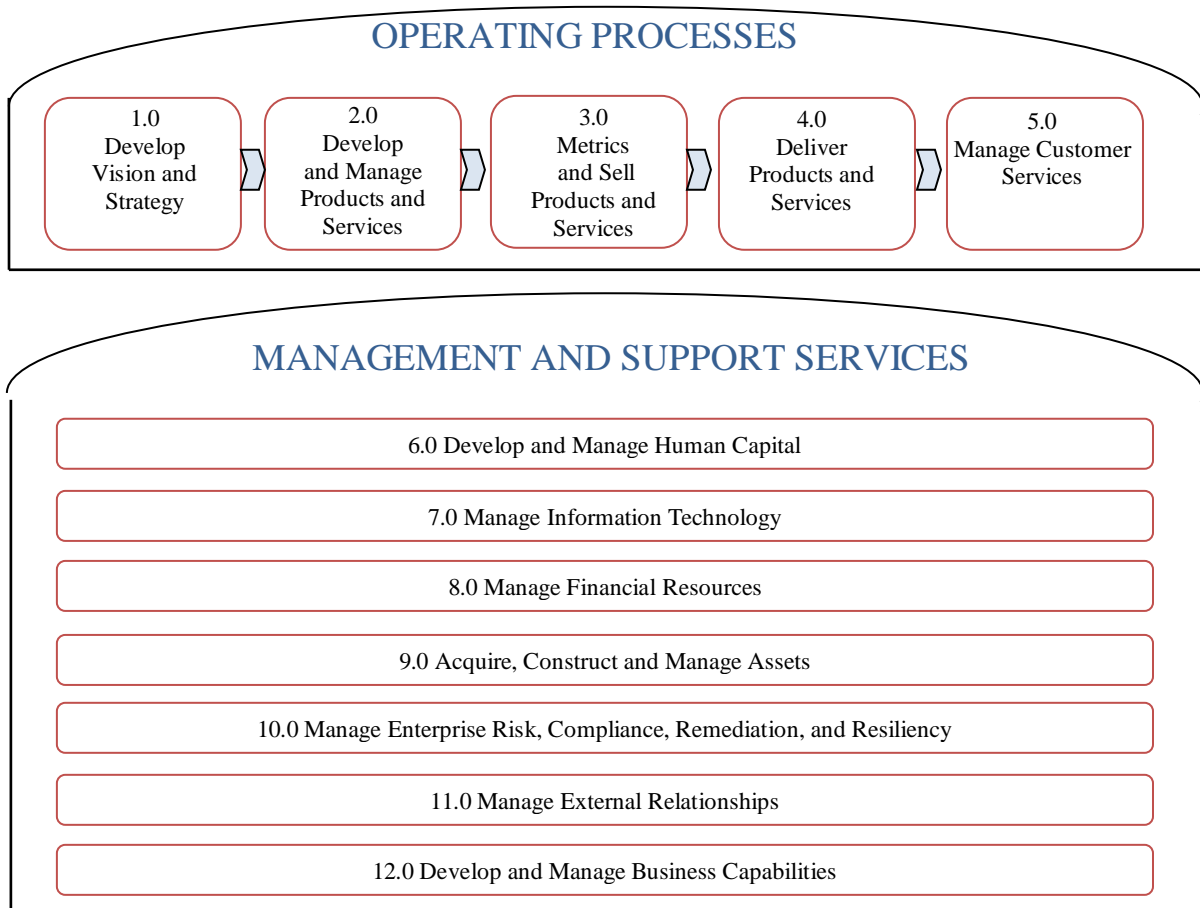
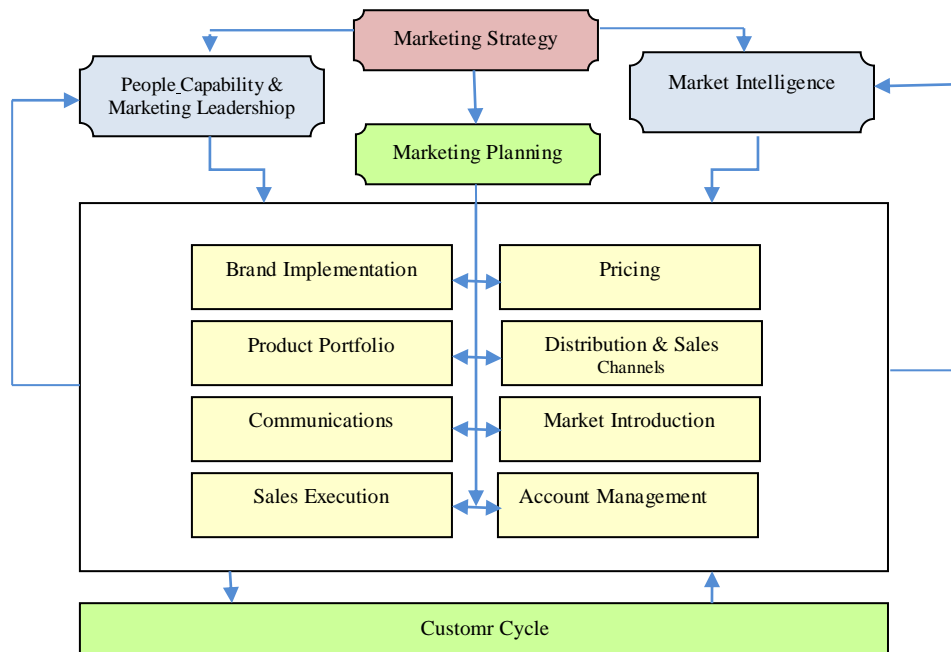


Figure 3. The view of PCF Model into 2 main process groups

**Philips Model** – This model was developed by Philips Company. It was introduced as a tool for overcoming the weaknesses of EFQM and can be divided into 12 sub-processes. Figure 3 offers a view of this model.





**Figure 4. Philips Model with its processes**

**SAP Model** – SAP stands for Systems, Applications, and Products in Data Processing and it is classified into 4 main areas: Marketing, Sales, Service and Interaction channels. Table 3 presents the four areas of the model.

**Table 3. The areas of SAP model**

Marketing	Marketing Planning, Segment Management, List Management, Campaign Management, Trade Promotion Management, Lead Management, Marketing Analytics
Sales	Sales Planning, Territory Management, Account and Contact Management, Activity Management, Opportunity Management, Quotation and Order Management, Product Configuration and Pricing, Billing and Contract Management, Incentive and Commission Management, Time and Travel Management, Sales Analytics
Service	Installed Base Management, Warranty Management, Knowledge Management, Contract and Entitlement Management, Resource Planning, Service Order and Service Ticket, Complaints and Returns, Service Analytics
Interaction Channels	Telemarketing, Telesales, Teleservice, Interactive Center Analytics

### 3.3: Specifying Factors to assess model quality:

In Section 2, three models should be shortlisted from the 6 nominated models based on the best quality factors. Mudi and Shank (1994) derived a set of desired characteristics that indicate a model of high quality: Flexibility, Understandability, Usability, Completeness and Generality. Every model can be described by a set of desired characteristics that can also be used to assess model quality. The following items are brief descriptions of the 5 factors they introduced:

**Flexibility:** Ease with which a reference model adapts and accommodates to changes of the requirements other than those for which it was specifically designed.

**Understandability:** Degree to which the purpose, concepts and structure of the reference model is clear to the users.

**Generality:** Degree to which the reference model performs a broad range of functions and is usable in different cases.

**Usability:** Ease with which user can operate, implement and apply the reference model.

**Completeness:** Degree to which all the components of the reference model are present under a predefined scope.

### 3.4. Identifying CRM Objectives

A better process is thus one that better contributes to meeting the strategic objectives of an organization (La Rosa et al, 2017). Therefore in Section 4, it is believed to identify the CRM objectives in order to distinguish suitable processes accordingly.

Based on Amer Ijaz’s research in 2005, CRM objectives are classified in to 4 main groups: Customer Identification, Customer Differentiation, Customer Interaction and Personalization. Table 4 presents the four groups.

**Table 4. CRM Objectives based on Amer Ijaz’s research (2005)**

<b>Customer Identification</b>	<b>Customer Differentiation</b>	<b>Customer Interaction</b>	<b>Personalisation</b>
Identify customers via marketing channels	Differentiate customers with respect to profitability	Organizations should continuously learn about its customer	Treating each customer uniquely
To acquire new customers	Each customer has his or her own unique needs	Improve and increase communication between a company and its customers	Customizing products and services
Discover new customers	Use service to differentiate products	Responding appropriately to customer request	Ensure that the customer receives personalized product offer
-	-	Building an attractive virtual community	-
-	-	Establishing relationship with customers	-
-	-	Improve interaction with customers	-
-	-	Keeping track with customers	-

## 4. Methodology

The section below describes the methodology of this paper. The method is descriptive and practical and data collection incorporated interviews and questionnaires. The universe in Section 2 is CRM professionals and professors among international groups of LinkedIn site. A random sample was recruited from different groups (such as SAP, APQC, ERP Community and Microsoft Dynamics CRM Fun-as-Usual in). The universes in Sections 4 and 5 are managers and experts of a manufacturing Company in Tehran, Iran named “Pand Caspian Company”.

At this present research, AHP and QFD calculations were performed on [www.bpmsg.com](http://www.bpmsg.com) using Microsoft Excell 2010. In order to perform AHP technique, first the decision hierarchy was structured from the top with the goal of the decision, through the intermediate levels to the lowest level (which is a set of the alternatives).

This paper has attempted to provide a brief summary of some suitable reference models and design CRM processes based on the selected models for our case study.

The following part of this paper moves on to describe in greater detail how the AHP technique was used. The factors introduced in part 3-3 would be allocated on the second level of AHP Hierarchy and the six reference models mentioned before in the third level. Figure 4 shows the AHP hierarchy:

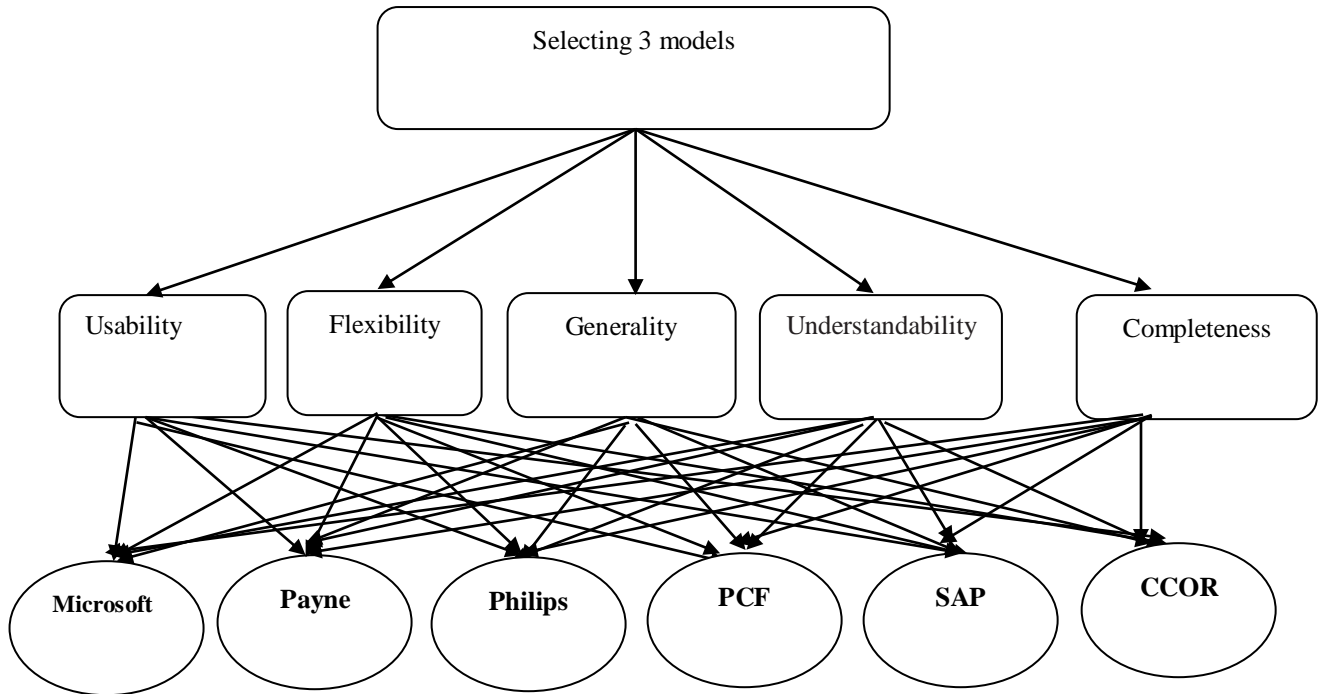


Figure 5. The AHP hierarchy of selecting 3 models out of 6 models

In terms of AHP technique, seven sets of pairwise comparison matrices were constructed, one for the factors with respect to the goal and six matrices of factors with respect to the reference models. Then, some CRM professionals and professors were asked to fill in AHP questionnaire with the scales of 1, 3, 5, 7 and 9. The questionnaire was in both Persian and English languages. 25 ones were distributed among different people in SAP, APQC, ERP Community and Microsoft Dynamics CRM Fun-as-Usual groups of LinkedIn. Just 10 questionnaires were completely filled and returned. Also, a glossary of information on the six models was sent to help the responders.

Having done the calculation, the first pairwise comparison matrix of factors with respect to the goal would be presented in Figure 5.

Matrix	Completeness	Flexibility	Generality	Understandability	Usability	0	0	0	0	0	0	normalized principal Eigenvector
Completeness	1	5/7	4 1/5	3/7	1/3	-	-	-	-	-	-	14.56%
Flexibility	2	1 2/5	3	2/3	1/2	-	-	-	-	-	-	17.36%
Generality	3	1/4	1/3	1/4	1/5	-	-	-	-	-	-	5.56%
Understandability	4	2 1/3	1 4/9	4 1/9	1/2	-	-	-	-	-	-	24.47%
Usability	5	2 4/5	2 1/6	5	2	-	-	-	-	-	-	38.04%
0	6	-	-	-	-	-	-	-	-	-	-	0.00%
0	7	-	-	-	-	-	-	-	-	-	-	0.00%
0	8	-	-	-	-	-	-	-	-	-	-	0.00%
0	9	-	-	-	-	-	-	-	-	-	-	0.00%
0	10	-	-	-	-	-	-	-	-	-	-	0.00%

Figure 6. The paired comparison matrix with respect to the goal

With regard to the weights above, the most prioritized factors are “Usability”, “Understandability” and “flexibility” with the priorities of 38.04%, 24.47% and 17.36% respectively. It is clear that its Consistency Ratio (CR) is 2.4% and acceptable (less than 10% is fine). Following, the overall composite weight of each alternative was computed (Table 5).

**Table 5. Overall composite weight of the alternatives**

Criteria	Usability	Understandability	Flexibility	Generality	Completeness	Overall weight
	0.3804	0.2447	0.1736	0.0556	0.1456	
CCOR	0.1982	0.1928	0.1880	0.2114	0.2280	0.2001 2
SAP	0.2734	0.1730	0.3926	0.4062	0.2121	0.2679 1
PCF	0.1522	0.1769	0.1188	0.1100	0.1797	0.1541 3
Philips	0.1166	0.1332	0.0774	0.0739	0.1089	0.1103 6
Payne	0.1468	0.1854	0.1059	0.1037	0.1563	0.1481 4
Microsoft	0.1127	0.1387	0.1134	0.0948	0.1150	0.1185 5

As discussed above (in Section 3), SAP, CCOR and PCF models are the most prioritized and weighted. Subsequently, all CRM processes of the three mentioned models were extracted and gathered in a united list. At this stage, the repeated processes were eliminated. Table 6 provides the process framework in 5 categories with the equal processes in the three models.

**Table 6. The proposed process framework of the present research**

Equal Process in PCF	Equal Process in CCOR	Equal Process in SAP	Process Name	Process Group	Life Cycle of Customer
Relate Plan	Develop and manage marketing plan	Marketing Plan	Marketing Plan	<b>Marketing</b>	Before gaining Service/ Product
Develop high and detailed solutions	Portfolio Management		Service/ Product Portfolio Management		
Relate to Grouped Account/ Named account	Understand markets, customers and capabilities	Segment Management	Segment Management		
	Develop and Manage Media	Campaign Management	Campaign Management		
Identifying potential customers	Develop and manage sales plan	Lead management	Lead management		
Relate Enable		Marketing Analysis	Marketing Analysis		
Sell planning	Develop Sell Strategy	Sell Plan	Sell Plan	<b>Sell</b>	During gaining Service/ Product
Manage Sell Network	Develop and manage Sell plan	Opportunity Management	Opportunity Management		

Portfolio Solution Management	Develop Marketing Strategy	Product Configuration and Pricing	Product Configuration and Pricing		
Customer Chain Planning	Develop Customer Relationship Management	Account Management and Contracts	Chain Customer Configuration Management		
Sell to Grouped Account/ Named Account	Delivery Services to Customers	Contract Management and Statements	Contract Management and Statements		
Sell Enable		Sell Analysis	Sell Analysis		
Assist Plan	Plan and Customer Service Operation Management		Service Plan	<b>Service</b>	
Chain Customer Asset Management	Acquire, Construct, and Manage Assets	Installed Base Management	Installed Base Management		
Remote Assist/ On-site Assist	Delivery Service to Customers	Service Contract Management	Service Contract Management		
Contract with Mediators	Plan and align Supply Chain Resources	Resource planning	Supply Chain Resource Planning		
Close Request	Customer Complain Management	Complains and Refunds	Complains and Refunds		
Assist Enable		Service Analysis	Service Analysis		
	assess the external environment		Assess the external environment		
	Perform internal analysis		Perform internal analysis		
	Establish Strategic Vision		Establish Strategic Vision	<b>Strategy Development</b>	After gaining Service/ Product
	Develop mission statement		Develop mission statement		
	coordinate and align functional and process strategies		coordinate and align functional and process strategies		
Relate with mediators	Define and Manage Interaction Channel	Customer Interaction Channel	Customer Interaction Channel	<b>Integrate Multichannel</b>	
Telemarketing		Telemarketing	Telemarketing/ E-marketing		
Telesales		Telesales	Telesales/ E-sales		
Teleservice		Teleservice	Teleservice/ E-Service		
		Interaction Channel Analysis	Interaction Channel Analysis		

## 5. Case study- Pand Caspian Company

Having discussed how to construct the proposed process framework by extracting the CRM processes from the selected reference models (Section 3), the next section of this paper addresses to our case study.

Pand Industrial group is a holding company that owns four subsidiaries named as PandTech, Pand Service, Dara Electronic, and Pand Caspian. Pand Caspian Company started working as the largest manufacturer of road bascules and weighing systems in Iran in 2007. It has 2

factories in Eshtehard and Qazvin Industrial Cities. The factory in Eshtehard produces electrical weighing systems and the other makes mechanical weighing equipment. Moving on now to identify and determine strategic objectives of our case study, when the processes of the first three models were extracted (Table 6). Therefore, first based on the objectives mentioned in part 3-4, the strategic objectives of the company were identified by interviews with some of its senior managers (Table 7).

**Table 7. The strategic objective of Pand Caspian Company**

Customer Identification	Customer Differentiation	Customer Interaction	Personalisation
Obj. 1: Identify customers via marketing channels	Obj.3: Offering extra services and spare parts to get more satisfaction of customers	Obj.5: Learning more from customers in order to design and manufacture better	OBJ.7: Customizing road bascules according to customers' requests
Obj. 2: To acquire new customers by persuading them and giving more information	Obj.4: Identify demands and needs of customers individually	OBJ.6 Electronic communications (to introduce new products, new services by email, SMS, etc.)	Obj. 8: Guarantee quality of products in respect to its raw material and production

On the other hand, the objectives in organizations don't have the same priority. Therefore, the strategic objectives were weighted by AHP technique and compared in pairs by 5 managers. It is clear that the pair-wise comparison matrix of objectives is consistent and acceptable (the CR is 2.3%). Table 8 shows the pair-wise comparison matrix of objective

**Table 8. the pair-wise comparison matrix of objectives**

Pand Caspian	Obj.1	Obj.2	Obj.3	Obj.4	Obj.5	Obj.6	Obj.7	Obj.8	Final Weight
Obj. 1	1	1 1/7	1 1/4	1 1/3	2 2/5	1 5/8	1 2/7	2	2 .176
Obj.2	7/8	1	1 2/9	1/3	3/4	1 5/6	7/8	1 1/7	5 .111
Obj.3	4/5	5/6	1	2/5	1 3/7	7/8	3/5	1	6 .099
Obj.4	3/4	2 3/4	2 5/9	1	1 1/4	2	1 3/4	1 8/9	1 .195
Obj.5	2/5	1 1/3	2/3	4/5	1	1 5/7	1	1 3/7	4 .117
Obj.6	5/8	5/9	1 1/7	1/2	4/7	1	5/8	3/4	8 .083
Obj.7	7/9	1 1/7	1 2/3	4/7	1	1 3/5	1	1 1/4	3 .125
Obj.8	1/2	7/8	1	1/2	5/7	1 1/3	4/5	1	7 .095

Then in Section 5, to prioritize key CRM processes according to its objectives, the first House of Quality (HOQ1) was built. The strategic objectives were put in Customer Requirements (WHATS) and the 28 processes introduced in table 6, were put in Engineering Characteristics (HOWS) as shown in Figure 6.

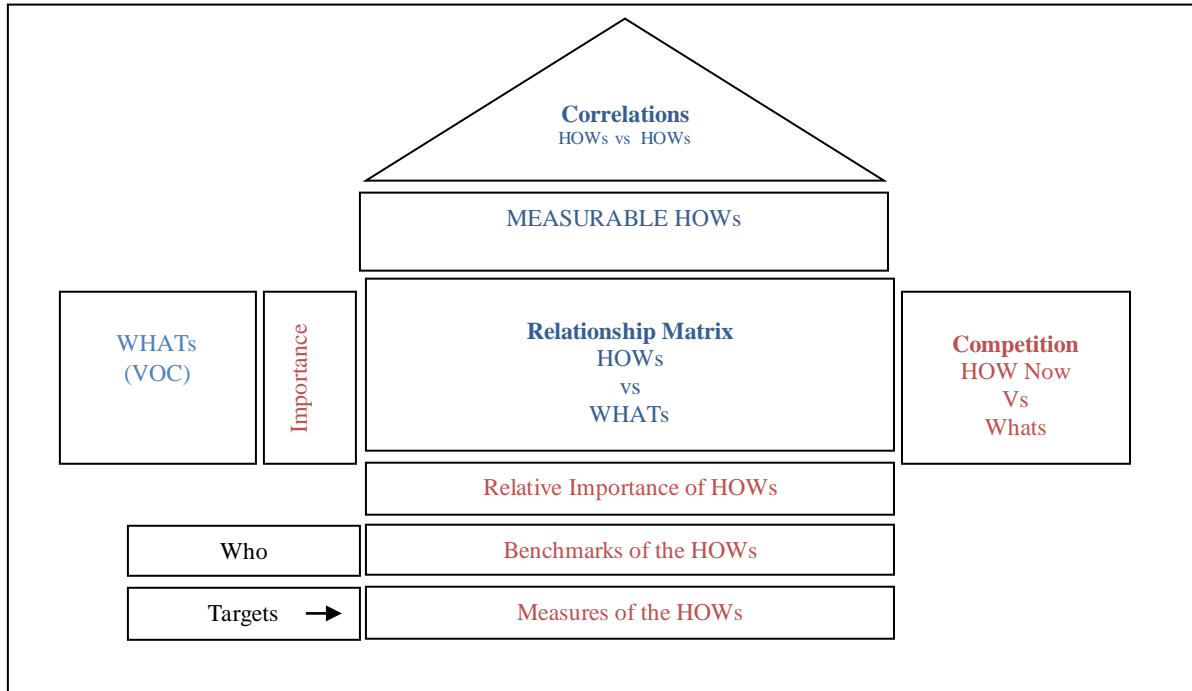


Figure 7. The House of Quality

To complete the HOQ1, five managers and experts of the company were interviewed and asked to prioritize the processes from the range of 1 (the least important) to 10 (the most important) based on the strategic objectives of their company. The free houses in HoQ1 show that the responders have found no relation between the process and the objective.

Once all questionnaires returned back, the average rate of each house was calculated based on the 5 responders.

Finally, the rates were multiplied by the weights of the objectives and summed up in the column. Table 9 presents the completed HOQ1. In summary, it has been shown from this result (Table 9) that the most important CRM processes of the company are Marketing Planning, Telemarketing/ E-marketing and Supply Chain Resource Planning.

**Table 9. Results of HoQ1 and prioritization of CRM processes**

Process Group			Marketing						Sell					
No.	Weight of Objectives	Objectives	Marketing Plan	Portfolio Management	Segment Management	Campaign Management	Lead management	Marketing Analysis	Sell Plan	Opportunity Management	Product Configuration and Pricing	Chain Customer Configuration Management	Contract Management	Sell Analysis
1	0.176	Identify customers via marketing channels	6.3	5.6	2.2	5.4	5.9	3.6	7.8	1.4	9.0	6.4	4.2	5.6
2	0.111	To acquire new customers by persuading them and giving more information	5.7	6.6	6.3	6.0	7.5	4.1	6.5	5.1	5.1	4.9	4.0	4.9
3	0.099	Offering extra services and spare parts to get more satisfaction of customers	8.5	6.5	6.1	3.0	7.4	6.0	4.1	8.9	6.0	4.9	6.1	4.0
4	0.195	Identify demands and needs of customers individually	6.0	7.8	6.5	4.1	3.1	5.8	7.5	7.0	2.6	1.4	4.7	6.8
5	0.117	Learning more from customers in order to design and manufacture better	7.6	2.5	2.7	0.0	4.8	7.4	1.3	4.9	4.4	2.6	8.0	4.4
6	0.083	Electronic communications (to introduce new products, new services by email, SMS, etc.)	6.6	6.0	3.4	6.4	5.5	2.6	5.6	3.7	6.6	3.0	4.5	6.8
7	0.125	Customizing road bascules according to customers' requests	4.0	7.1	4.0	1.8	3.0	4.4	4.7	4.6	5.8	5.6	5.0	7.2
8	0.095	Guarantee quality of products in respect to its raw material and production	7.6	1.8	6.0	2.0	2.0		1.8	4.6	4.2	5.0	2.2	6.2
Rates			6.4	5.7	4.7	3.7	4.8	4.4	5.3	5.0	5.4	4.2	4.8	5.6
Ranks			1	4	16	26	14	19	9	12	8	24	13	7

**Table 10. Other parts of HoQ1 of Pand Caspian Company**

Service						Strategy Development					Integrate Multichannel				
Service Plan	Installed Base Management	Service Contract Management	Supply Chain Resource Planning	Complains and Refunds	Service Analysis	Assess the external environment	Perform internal analysis	Establish Strategic Vision	Develop mission statement	coordinate and align functional and process strategies	Customer Interaction Channel	Telemarketing/ E-marketing	Telesales/ E-sales	Teleservice/ E-Service	Interaction Channel Analysis
6.0		1.4	7.6	1.2	3.4	5.6	0.8	4.3		3.0	6.0	7.8	7.0	6.3	5.3
5.2	4.3	3.7	6.0	6.6	6.6	6.7	2.4	3.0	2.3	3.1	2.0	6.1	7.4	2.0	3.3
2.0	7.3	6.1	6.3	3.4	4.5	4.9	1.5	7.0	3.0	5.3	5.0	7.6	6.9	7.6	9.0
6.0	3.4	8.2	7.3	5.2	4.0	3.8	5.3	2.7	3.7	4.5	8.4	5.3	5.8	2.8	4.8
3.5	5.0	3.4	7.8	3.3	4.2	4.4	6.1	3.3	6.0	4.6	7.9	6.3	3.4	6.5	5.0
3.0	5.4	4.3	6.1	6.3	5.2	4.3	4.8	5.6	6.0	6.4	7.6	6.5	6.6	6.2	6.5
6.0	6.4	5.0	1.8	7.7	5.6	4.6	5.5	3.4	8.3	3.8	4.2	6.0	5.0	3.4	1.8
8.2	6.0	1.0	4.8	0.4	0.2	0.6	0.6	3.4	1.8	8.0	2.0	2.0	2.0	4.6	5.8
5.2	4.3	4.3	5.8	4.2	4.2	4.5	3.5	3.9	3.6	4.6	5.7	6.0	5.7	4.8	5.0
10	21	20	3	22	23	18	28	25	27	17	6	2	5	15	11
0.091			0.102								0.090	0.106	0.100		

## 6. Conclusion

At the beginning of this paper we presented two questions. The first question was about CRM reference models in the literature to develop a valuable process framework. For this question, based on our access to RMs and practicability six reference models were shortlisted and the map of the models with processes were in detail described. Then, in order to optimize the results of this paper with due consideration to our limited time and budget, three models were shortlisted and a united process framework was offered. We recommend this framework to



be used in future process modeling projects, as these are the most suitable processes in CRM area we have found.

There is a lack of empirical studies in the literature that analyze reference models and process modeling, which is how they are most frequently used in practice. Therefore, we established question 2 "How can organizations choose their business processes from reference model using a systematic procedure and based on their strategic objectives?"

Consequently, we planned and conducted a case study in which the processes of a manufacturing company were all prioritized by using our proposed process framework and the company's strategic objectives. We evaluated the more important processes by identifying its objectives.

However, the results are just suitable to this specific company, but the framework can be easily used for companies based on their strategies. Table 10 indicates Marketing Planning is the most important process in the mentioned company. Other priorities are shown as below.

**Table 10. The prioritization of the most important processes of Pand Caspian**

Process Name	Weight	Rank
Marketing Planning	0.112	1
Telemarketing/ E-marketing	0.106	2
Supply Chain Resource Planning	0.102	3
Service and Product Development	1.000	4
Telesales/ E-sales	0.100	5
Customer Interaction Channel	0.090	6
Sales Analysis	0.098	7
Product Configuration and Pricing	0.095	8
Sell Analysis	0.094	9
Service Planning	0.091	10

## 7. Limitations and further research

Our research has some limitations which inspire us for future work. On the side of our systematic review, we are unable to guarantee the exhaustiveness of our search, as this is impossible (Brocke et al., 2015). Despite a lot of reference models being introduced in previous studies, most couldn't be used practically used due to close source and also we didn't have access to the content of some practical models. Therefore, we were forced to consider some criteria to choose the reference models such as access to the model, being practical and updated of the model.

Another limitation of our search is that gaining more information needs much time and budget.

In a future work, it's important to investigate other reference models to develop a better framework. The research would have been more relevant if a wider range of reference models had been explored.

Since there is no Iranian CRM software in Iran and few companies buy their software very extensive from outside, therefore it would be great idea to localise such software by further practical research. In addition, the authors would like to suggest that companies can use the procedure in identifying and designing their processes.

Finally, this study would have been more useful if the the process framework was applied in a CRM Software. So, a more comprehensive study would include a CRM process framework customizing CRM software especially for Iranian companies.

## **8. Managerial implications**

For managers and practitioners working in the area of CRM, this research provides direction to design CRM processes. For example, organizations may need help to develop the organizational processes, skills, and knowledge necessary to effectively apply customer data in order to create effective interaction or communication points.

We suggest that companies especially those which are interested in customizing their CRM systems should focus more on processes of their company and seek what exactly they need based on their strategic objectives.

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